TRAINING AND DEVELOPMENT OF END-USERS FOR MANAGEMENT INFORMATION SYSTEMS

THESIS

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ASHRAF NAIM

DEPARTMENT OF BUSINESS ADMINISTRATION
ALIGARH MUSLIM UNIVERSITY
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ALIGARH, (U.P.)

(ASHRAF NAIM)

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PREFACE

The appearance of personal computers in the early eighties has increased the use of computers by non-professionals in organisations. This emerging concept is known as end-user computing. The need for increased level of computer literacy among end-users presents a challenge to training and development professionals. There are variety of factors that complicates end-user literacy demands. Such as, demand for support surpassing the facility available, high turnover among information systems professionals, and the lack of software standardisation. Further, literacy demands are becoming an unfolding process directly linking to end-user sophistication and technological advances.

All this means that organisations should employ a variety of learning techniques to meet the literacy demand of end-users. One alternative is to develop trainers from within end-users working in different functional area. This can play a vital role in successful adaptation of information technology by end-users.

The study is designed to find out the extent of involvement of end-users in computer related training and

development activities. Measure the end-users level of satisfaction with computer training programmes and their perception about the role that they play in computer related training and development activities. The aim of the study was also to identify the most preferred mode of learning and the type of relationship that end-users prefer between trainers and learners.

In this study survey research has been used. Descriptive cross sectional study is adopted to identify characteristics of end-users, measure their attitude and to find out their extent of involvement etc. The relevant information and data collected, have been presented and analysed in this thesis to find out how much it is possible to train the end-users as trainers and the factors to be considered for increasing end-users involvement in training and development activities.

The study has been presented under five different chapters. The details are as follows.

Chapter 1 traces the evolution of information processing, discusses the basics of computer based information systems, reviews the historical background of information technology

manpower requirement in India and looks into the present position of computer training in India.

Chapter II introduces the reader with studies pertinent to this research with the view to enrich the literature with relevant and latest information. The chapter is divided into five sections starting with literature related to importance of training in information system development. This is followed by literature related to the status of training and development in India, training and development in future, end-user computing, and attitude and involvement of end-users and its effect on information system success.

Chapter III deals with the methodology of research. The section wise descriptions of the need for the study, statement of the problem, operational definitions, research questions and research hypothesis, research design, population and sample, data collection method, analysis and interpretation, and limitations of the study have been made in this chapter.

Chapter IV analyses and interprets the data collected for this study. Chapter V provides an overview of the study and the conclusion drawn from it. Theoretical and practical

implications along with direction for future research have been given in this chapter. The practical implications of the findings have been discussed as policy recommendation for future training programmes. Bibliography of books, journals, magazines, reports etc. used in the study have been attached at the end of the report followed by three appendices.

This study will be of use for training and development staffs and organisations alike in deciding the future strategies for enhancing computer literacy of end-users in organisations.

CHAPTER ONE

INTRODUCTION

CHAPTER - I

INTRODUCTION

This chapter is divided into three sections. The first section deals with evolution of information processing. Second section concentrates on the basics of computer based information system. The third section focuses on the manpower requirement in India and computer training in India.

1.1 EVOLUTION OF INFORMATION PROCESSING

The data processing methods can be classified into four categories:

- manual,
- machine - assisted manual,
- electro-mechanical punch card, and
- electronic computer.

The `abacus' also known as `soroban' was the first mathematical device used by Chinese to ease arithmetical computation.[1] Although the abacus was invented around 600

B.C., it is still a widely used calculator in the Far East.

Charles Babbage, Professor at Cambridge University, in the year 1822 designed a `Difference Engine' which was capable of producing reliable tables. However, the first computer capable of performing basic arithmetical functions was designed in 1842 by Charles Babbage, which he called the `Analytical Engine'. Babbage envisioned an Analytical Engine that could solve variety of problems. Unfortunately he was not able to produce a working model because the precision engineering required for manufacturing such a machine was not available during that period. However he established several principles that later became fundamental to the design of digital computers.

The first electrical computer was developed in the year 1947 called Electronic Numerical Integrator And Calculator (ENIAC). It was constructed at the Moore School of Engineering of the University of Pennsylvania, U.S.A.. Around the same period John Von Neumann introduced the concept of stored program. Based on this concept the Electronic Discrete Variable Automatic Computer (EDVAC) was developed. Almost simultaneously with EDVAC the Britishers

developed the Electronic Delay Storage Automatic Calculator (EDSAC). These computers used vacuum tubes as a result they used to be bulky and prone to hardware failures.

In 1956 Bell Laboratories developed the first transistor, ushering an era of solid state technology. Transistors were smaller and more reliable successors to the vacuum tube. In 1959 IBM 1401 were introduced using transistors. These second generation computers were more reliable and generated less heat.

During 1960s `integrated circuits' (ICs) were introduced into computer technology. In this technology of `microelectronics', it was possible to integrate large number of circuit elements into a very small surface of silicon known as `chips'. As a result computers became even more reliable, processing speed increased and heat generation was further reduced.

Later with the advancement of IC technology it was possible to integrate up to a hundred components on a single chip. This technology became known as Medium Scale Integration (MSI). Which was followed by the era of Large Scale Integration (LSI) in which, it was possible to integrate up

to 30,000 components on a single chip. ICs were further miniaturised with the coming of Very Large Scale Integration (VLSI). As a result computer became smaller and smaller and more reliable. Table 1.1 on page 6 gives an overview of the evolution of computers.

1.2 FOUNDATION OF COMPUTER BASED INFORMATION SYSTEMS

Today, information system forms an integral part of any organisation whether it deals with product or service. Information is required in the organisation for

- decision making, and
- control (i.e., for evaluation of performance).

Information systems can be defined as "a set of procedures that collect, process, store, and disseminate information to support decision making and control."[2] While a "computer-based information system (CBIS) is an information system in which the computer plays a major role."[3]

Information systems have started to play a vital role in organisations. Now there is a growing interdependence between information system software, hardware, data and telecommunications on the one hand, and business strategy

Table 1.1: Evolution of Computers

Period	Events	
Circa B.C.	The first mathematical device	Abacus
17th cetury	The first four-function calculator	Machine arithmetic
1830-50	The first computer (mechanical)	Analytical engine
1885	The first computer cards	Hollerith cards
1930	Card reader, sorter, and accounting machine	Unit record machines
1946	Stored program concept by Von Neumann	
1947	ENIAC - the first electronic digital computer using vacuum tubes.	First generation computers
1949	EDSAC - the first stored program electronic computer	
1949	Transistors	
1950	Voluminous storage and sequential access devices	Magnetic tapes
1958	Computer using transistors	Second generation computers
1959	Random access devices	Discs
1964	Integrated circuits (ICs)	
1965	Computers using ICs	Third generation computers
1969	Large Scale Integrated (LSI) circuits	
1971	Computers using LSI circuits	Fourth generation computers
1972	Microprocessors	
1976	First microcomputer	The Apple computer

Adapted from: Bhatnagar, S.C., and Ramani, K.V., Computer and Information Management: a primer for practising managers, New Delhi, Prentice-Hall of India Private Limited, 1991.

rules and procedures on the other. Earlier systems, during 1950s, brought changes that were technical in nature. They were relatively easy to attain as few people got affected. During 1960s and 1970s systems started affecting managerial control and behaviour. From 1980s onwards systems started institutional "core" changes (i.e., what products and services are produced, under what condition, and by whom).[4]

1.2.1 Components of information systems

The five main components of CBIS are:[5]

- Hardware,
- Software,
- Data,
- Procedures, and
- People.

The first three come under the heading of technology. "Technology refers to the information, equipment, techniques, and procedures required to transform inputs into outputs."[6]

The term Hardware refers to machinery, which includes Central Processing Unit, input devices, output devices, and communication devices.

Softwares are machine - readable instructions that direct the hardware to function in the way that would produce relevant information from data. Or in other words, software consists of the totality of programs and routines that are used to make the hardware perform its data processing functions.

Data are raw and unorganised facts that are used for generating information. These may be in numerical, non - numerical, or pictorial form. These facts can be generated everywhere in any organisation. In other words, all that we perceive through our senses are data to us. Procedures are the policies that govern the working of the computer system.

In people are included system analysts, system designers, application programmers, maintenance programmers, systems programmers, data entry operators, and data security staff. They form the back bone of any information system and are the main influencing factor in the success or failure of

an information system. Information system group (people) acts as a powerful change agent in the organisation. This group has started playing a major role in the coordination and development of technology, as well as planning changes in the organisation.

These five components of information systems are interdependent and interact with each other. A change in one component effects other components of the system.[7]

1.2.2 Information systems taxonomy

In an organisation there are different interests, specialities and levels. As a result we have different types of systems, to serve different organisational interests.[8] There are five major types of systems:

- Transaction Processing Systems (TPS),
- Office Automation Systems (OAS),
- Management Information Systems (MIS) or Information Reporting Systems (IRS),
- Decision Support Systems (DSS), and
- Executive Support Systems (ESS).

Transaction Processing Systems (TPS), are operational level systems, which keep the track of elementary activities and transactions (such as sales, receipts, cash deposits, flow of material etc.) of the organisation. They are designed to keep an organisation running smoothly and cost effectively by automating the processing of voluminous amounts of paper work. TPS are major producer of information for other information systems as a result making them extremely important for organisations.

Office Automation Systems (OAS), refers to a wide range of Computer Based Technology, which support managerial and clerical activities with facilities for word processing, electronic massaging, and document reproduction.

Management Information Systems (MIS) or Information Reporting Systems (IRS), focus on daily, weekly and monthly summaries of transactions, which is needed for monitoring and controlling operational level activities.[9] They support structured and semi-structured decisions, provide fixed types of information in pre-established format, they are usually concerned with data about the past rather than data relating to the future, and have little analytical capabilities.

Decision Support Systems (DSS), are customised systems supporting non routine decision making.[10] The focus is on supporting decisions making not replacing them. They help solving decisions that are semi-structured, unique or rapidly changing. They are flexible in specifying output requirement, easy to use, interactive in nature, and fast in response. They concentrate on middle level and top level managers and rely on effectiveness rather than efficiency. In short DSS is quick hit, interactive, model oriented, and action oriented systems.

Executive Support Systems (ESS) is that category of systems that support decision making by senior managers. They help senior managers in taking unstructured decisions, by drawing summarised information from Information Reporting Systems and Decision Support Systems, monitoring external environment, and by employing advanced graphics software. They help taking decision that lack structure, has high degree of uncertainty, and is future oriented.

Table 1.2 on page 12 shows the characteristics of different types of Information Processing systems.

Table 1.2: Characteristics of Information Processing Systems

Types of CBIS	Information Input	Processing	Information Output	Users
ESS	Aggregate data; external; internal	Graphics; simulations; interactive	Projections; responses to queries	Senior managers
DSS	Low-volume data; analytical model	Interactive; simulations; analysis	Special reports; decision analysis; responses to queries	Professionals; staff manager
MIS/[IRS]	Summary transaction data; high-volume data; simple models	Routine reports; simple models; low level analysis	Summary and exception reports	Middle managers
OAS	Office documents; schedules	Wordprocessing; storage retrieval	Documents; schedules; graphics; mail	Clerks; managers
TPS	Transactions; events	Sorting; listing; merging; updating	Detailed reports; lists; summaries	Operations personnels; supervisors

Adapted from : Laudon, K.C., and Laudon, J.P., Management Information Systems: A Contemporary Perspective, Singapore, Macmillan Publishing Company, 1990.

1.3 INFORMATION TECHNOLOGY MANPOWER IN INDIA

1.3.1 Manpower requirement in India

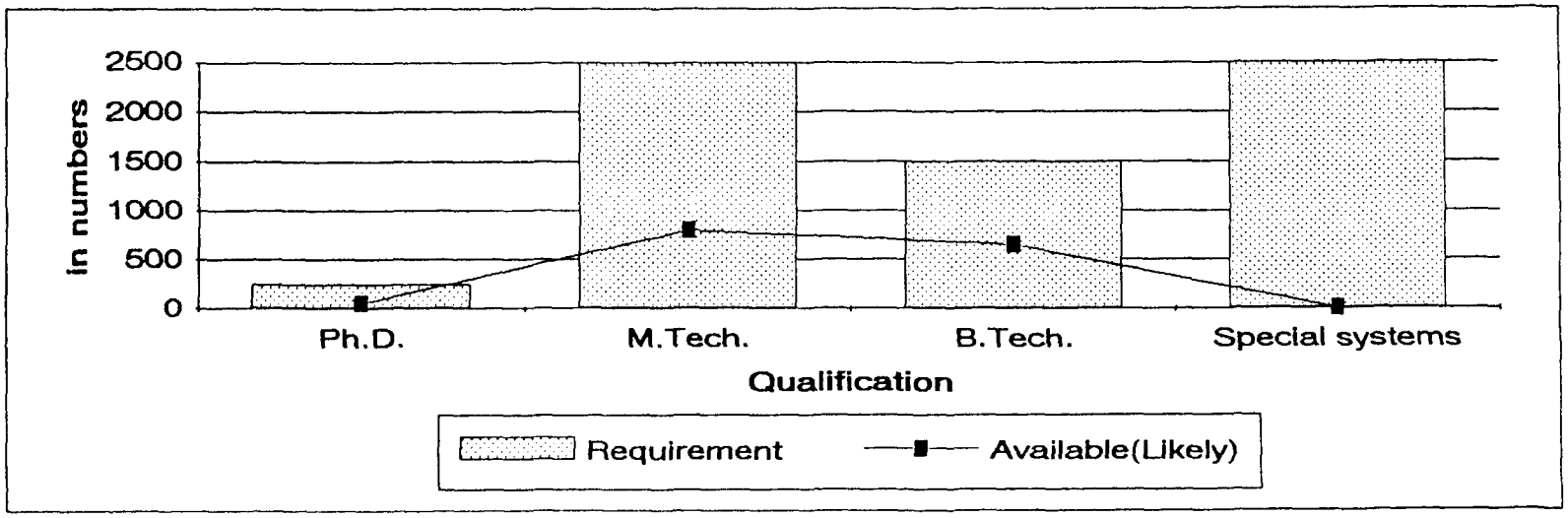
Need to develop manpower in India to meet the growing need of computerisation began to receive attention from 1975 onwards with the preparation of Perspective Report by Department of Electronics (DOE).[11] However, till 1978 no computer policies were formulated. Only after a study conducted by Prof. V. Rajaraman, the matter started receiving attention. His report formed the basis for action taken by the DOE. The Table 1.3 on page 14 gives Rajaraman Committee - estimated manpower requirement and the likely availability for the period 1980-85. In this report V. Rajaraman[12] gave various suggestions to improve the availability of personnel for computer. The main suggestions were:

- conducting teacher training programmes,
- increasing the intake of existing B.Tech. programmes,
- initiating a new `Master in Computer Application' programme at ten different educational institutions, and
- a one year crash course to quickly train thirty to forty students in each of the metropolitan centers.

Table 1.3 : Rajaraman Committee Report : Manpower requirement for 1980-85

Qualification	Requirement	Available(Likely)
Ph.D.	250	60
M.Tech.	2500	800
B.Tech.	1500	650
Special systems	2500	-

SOURCE: R . S. Pawar, "IT Manpower in India: The Burning Issue", in Bhatnagar, S.C., (ed.) Information Technology Manpower: Key Issues for Developing Countries, New Delhi, Tata McGraw-Hill Publishing Company Limited, 1992.



A Standing Committee on Computer Education was set up by DOE representing Ministry of Education, the UGC and academicians. The committee drew a phased five year plan for providing computer facilities in educational institutions.[13] In March 1981 Electronic Commission approved the Rajaraman Panel Report. At number of places like IITs, Delhi University etc. programmes on computer science were launched.

The manpower problem never assumed alarming proportions till November 1984, as computerisation in India was slow. However, the manpower problem became serious from 1985 onwards after liberalisation of computersation policies. As a result S. Sampath headed another committee to look into the requirement of computer manpower. The Table 1.4 on page 16 shows the summarised estimate for the period 1985-90.

Approximately during the same period study was also conducted at Indian Institute of Management, Ahmedabad (IIMA). Table 1.5 on page 17 gives the estimated manpower requirement by IIMA workshop (1985). This workshop also gave strategies for developing manpower. Table 1.6 on page 18 gives a detailed view of these strategies.

Table 1.4 : Computer Manpower Requirements (1985-90)

Qualification	Sampath Committee Report	Revised estimates by the CCI Wing	Output from existing programmes
Ph.D.	450	450	NA
M.Tech.	6400	6000	1800
B.Tech.	3800	6000	3500
MCA	6200	8000	3000
DCA	1100	40000	10000
DCE	3200	3000	1000
Vocational training	NA	>60000	25000

SOURCE : S. N. Zindal and P.K. Chaturvedi, "Electronic Manpower Development Programmes", IPAG Journal, 14(10), July 1987, pp. 592-593.

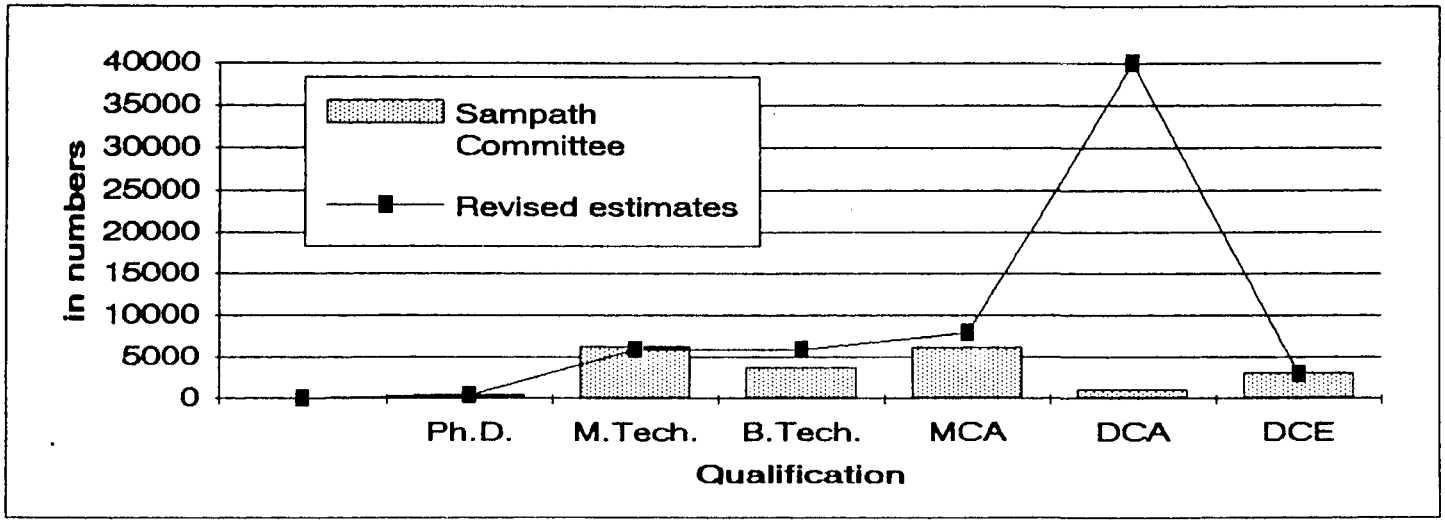


Table 1.5 : IIMA Workshop (1985): Manpower Requirement for 5 years

Qualification	Requirement
Information Analyst	8250
System Analyst A	15000
System Analyst B	40000
Programmer	50000
Hardware Engineer	1500 (for Minis & above)
	1000 (for micros)
Software Engineer (Suprt.)	12500
Operating Staff	13000 (Computer Operators)
	460000 (End-Users)

SOURCE: R . S. Pawar, "IT Manpower in India: The Burning Issue", in Bhatnagar, S.C., (ed.) Information Technology Manpower: Key Issues for Developing Countries, New Delhi, Tata McGraw-Hill Publishing Company Limited, 1992.

Table 1.6 : IIMA Workshop(1985): Strategies for developing manpower

Manpower Category	Sources	Strategy
Information Analyst	IIMs Institute of Informatics	New Institutions M.Tech. (Information Systems)
Systems Analyst (A)	MCA MBA (Systems background) B. Tech. M. Tech. with training	Enhancing MCA, MBA
Systems Analyst (B)	B.Sc. (Computer Science)	Graduate colleges to include Computer Science as main subject
Programmers	DCA Private Institutions Societies	Private Sector with quality control measures
Maintenance Staff (Engineers)	Engineering College	Existing colleges to restructure the course
Diploma Holders	Polytechnics	More polytechnics to offer DCE course
S/W Holders	IITs and other Engg. college	
Operating staff D/E	Non - formal	ITIs, Private Sector with quality control

Adapted from : R . S. Pawar, "IT Manpower in India: The Burning Issue", in Bhatnagar, S.C., (ed.) Information Technology Manpower: Key Issues for Developing Countries, New Delhi, Tata McGraw-Hill Publishing Company Limited, 1992.

The study team for the Eighth Plan made further estimates of additional manpower requirements and output available from the existing institutes. These estimates were based on the forecasted growth of the information technology sector. Table 1.7 on page 20 shows the estimated manpower requirements and availability as projected by 8th plan document.

As one goes through the various estimates of manpower requirement, we find that earlier exercises underestimated the demand. Further, it can be seen that later estimates realised the fact that Government education system (formal institutes) would not be able to meet the entire demand alone. This brought into focus the need of the non - Government sector (non - formal institutes) to meet the increasing demand of skilled computer users.

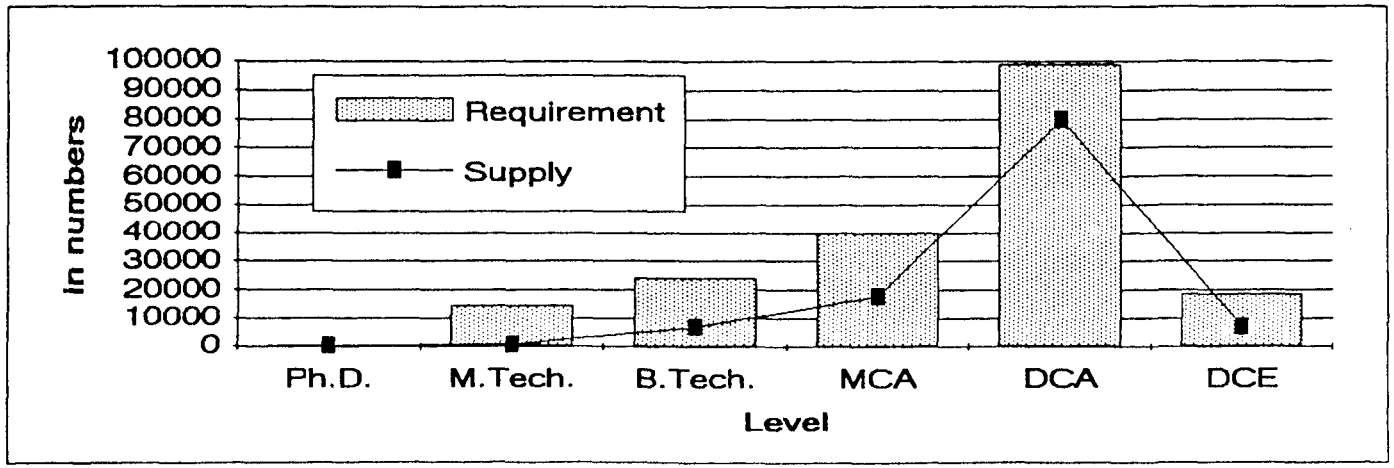
1.3.2 Computer training scenario in India

The manpower requirements are met either by formal institutions (i.e., Government funded institutes) or by non - formal institutions (i.e., Private institutes).

Table 1.7 : Eighth Plan: Manpower Requirements and Availability

	Level	Requirement	Supply
A.	Ph.D.	250	240
	M.Tech.	14500	500
	B.Tech.	24000	7000
	MCA	40000	18000
	DCA	99000	80000
	DCE	18500	7000
B.	Vocational courses	670000	-
C.	Short - term courses	1640000	-

SOURCE: Government of India, Department of Electronics, " Estimates of Manpower Requirement and Supply during Eight Plan", Report of the Working Group, Eighth Five Year Plan, (1990-5), Electronic Industry, August 1989, p. 134.



The main players in the formal sector are universities, IITs, and engineering colleges. The main courses offered by them are Ph.D/M.Phil, M.Tech./ME, M.Sc., B.E./B.Tech., MCA, DCA, and BSC. The entrance to these courses are difficult as there are limited number of seats available, and generally require mathematics/science background.

The problem with formal sector is that Hardware/Software infrastructure is limited. According to A.Roy,[14] the main problem with the formal sector is with the continuous updating of the syllabus. This is due to rigorous vetting and validation procedures followed by the formal sector in framing a syllabus. He suggests that non - formal sector can play a significant role in this area.

Due to an increased demand for qualified professionals in computer, number of private computer schools have mushroomed.[15] It is estimated that these training institutes are growing at the rate of 10 percent (in numbers) every year.[16]

In 1993-94 the individual training (Students) recorded a growth of 37.54 percent, notching up revenues worth Rs 124 crores. Corporate training had even a higher growth rate of

64.84 percent, with total revenues touching Rs. 30 crores. Table 1.8 on page 23 gives an overview of growth in terms of revenue over a period of three years.

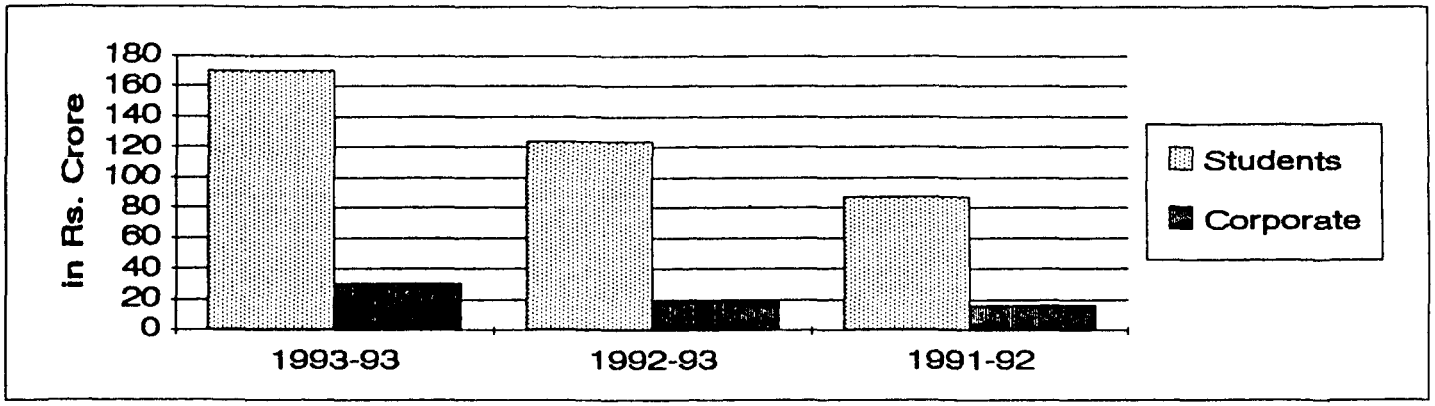
Unfortunately, this mushroomed growth of private institutes has lead to a number of problems. Some of them are misleading advertisements, exhorbitant fees and poor standard of training. To overcome the disorder in this segment a Working Group was set up under Prof. S. Sampath by the All India Council of Technical Education (AICTE). The main recommendations made by the working group were:[17]

- take the advantage of the facilities available with the institutions in the private sector, to meet the gap for the qualified computer professionals,
- give the stamp of excellence to institutions so that one can differentiate between the good and the bad ones,
- the stamp of excellence should be based on performance at examinations held for grading the students and on the infrastructure facilities at the institute,
- the stamp of approval should be given to only those institutions offering courses at four levels - O, A, B and C,

Table 1.8 : Training Business (Rs Crore)

	1993-93 (estimated)	1992-93 (estimated)	1991-92 (estimated)
Students	170	123.6	87.2
Corporate	30	18.2	16.5
Total	200	141.8	103.7

SOURCE : Raman R., "Computer Courses: A Wholesale Business", Dataquest, 12(6), 1994, pp. 84 - 98.



- the examinations should be conducted by two professional bodies, namely the Computer Society of India (CSI) and the Institution of Electronic and Telecommunications Engineering (IETE).

The government accepted the recommendations of the working group and as a result, the Department of Electronic Accreditation of Computer Courses (DOEACC) scheme was launched in January, 1991. For implementing the scheme in an integrated manner, DOEACC centres were established at Delhi, Bombay, Calcutta, and Madras. The scheme consists of two parts, namely, accreditation and examination. The responsibility of conducting the examinations for various level of courses rests with Computer Society of India (CSI) and the Institution of Electronic and Telecommunications Engineering (IETE). `O' and `A' level examinations are held by CSI while IETE has the responsibility for `B' and `C' level examinations. The responsibility of accreditation is jointly held by Department of Electronics(DOE), CSI, and IETE.

Initially `O' level scheme was launched. Later in July and October, 1991 the implementation of `A' and `C' levels respectively, was taken up. Subsequently `B' level was

launched in July 1992. The objective of the DOEACC scheme was three fold:[18]

- standardisation of quality education,
- safeguarding the interest of the students and avoid their exploitation,
- generating manpower according to the need of the industry.

The DOEACC scheme attracted many followers among the institution, but failed to establish itself as a standard among the users who hire the products of the systems[19].

Table 1.9 on page 26 gives a comparative view of leading training institutes in India in terms of: number of training centres, revenues, number of trainers, capital investments, and students trained. It is evident from the table that training institutes expect to increase their revenue any where from ten percent to fifty percent.

Recently there has been an upsurge in high-end-training. Dozens of companies have opened special training schools, offering specialised training on high-end software. Not only private companies, like Tata Elxsi India Ltd.(TEIL), Tata Information Systems Ltd. (TISL), TGK India Ltd.,

Table 1.9 : Leading Training Institutes in India

			No. of Training Centres		Revenues		No. of Trainers		Capital Investment		Students Trained	
	Head Office	Year of Starting	India	Abroad	1993-94 (estimated)	1994-95 (projected)	India	Abroad	Hardware	Software	Total	1193-94
Aptech Computer Education	Bombay	1985	150	5	6,300	8,000	1,200	24	2,000	100	200,000	45,000
Brilliant's Computer Centre	Madras	1988	78	-	329	500	333	-	150*	-	21,500	6,500
Datapro Information Technology	Bombay	1985	85	-	520	661	510	-	N.A.	N.A.	86,211	25,095
Digital Learning Services	Bangalore	1989	12	-	295	-	19	-	38*	-	N.A.	N.A.
India Education Centre (IEC)	New Delhi	1981	96	2	152	200	480	12	100	30	40,000	7,000
International School of Computer Technology	New Delhi	1989	38	-	100+	150+	200	-	50+	200++	4,000	2,000
Kurukshetra College	New Delhi	1987	20	-	100	110	114	-	150	10	30,000	4,000
NIIT	New Delhi	1982	121	6	6,882#	N. A.	600**	-	900++	-	260,800	55,000
Priyadarshini	New Delhi	1986	3	-	225	500	80	-	600	100	15,000	2,500
Software Technology Group International Ltd (STG)	New Delhi	1994	1	-	N. A.	150	10	-	12	6	N.A.	N.A.
Uptron ACL	Lucknow	-	73	-	1,500	2,000	350		640	570	35,000	15,000

* HW+SW # October-September ++ HW + SW excluding franchise

\+ Including franchise ** Total NA Not Available

SOURCE: Raman, R., "Computer Courses : A Wholesale Business", Dataquest, 12(6), 1994, p. 94

Novell Software (I) Pvt. Ltd., etc. are operating in this area but also government funded labs such as Centre for Development of Advance Computing (CDAC), Electronics Research and Development Centre (ER&DC), National Centre for Software Technology (NCST), and CMC Ltd. are also operating in the high-tech training area. Table 1.10 on pages 28 and 29 gives a list of Special T-Schools and software training offered by them.

The projections on the growth of Special T-Schools vary. Some estimate that the growth rate would not exceed more than 20 percent in the next one to two years. While others estimate a growth rate as high as 50 to 60 percent.[20] Therefore, it may be concluded that the rate of growth may be between 30 to 40 percent for the next few years.

Table 1.10 : Special T-Schools

	Networking	Database Applications	Graphics/ CAD, multimedia	Upper End Systems	Advanced Programming
Aptech Computer Education	Unix, C/S	Oracle	Multimedia	AS400	OOP
Advanced Computer Training School (CDAC)	Unix		Multimedia		SE,S/C
Bhari Info. Tech. Systems Pvt. Ltd.	Unix, C/S, Net	Progress	Graphics		
Brilliant's Computer Centre	Unix, C/S	Oracle			OOP
C-Set	Unix, C/S	Oracle, Ingres	CAD,Graphics	AS400	OOP
CADD Centre			CAD *		
CALS Ltd.	Net				
CMC Ltd.	Unix	Oracle, Ingres			SSAD
CMC Institute (CMS Computers Ltd.)	Unix, Net *				SE
Centre For Electronics Design & Tech.			CAD		VLSI,QM
Centre for Reliability					QM, RE
Computer Eyes	Unix, C/S, Net	Oracle		ES/9000	OOP, SE
Datapro Information Technology	Net *, Unix	Oracle	SAP *, Lotus *,	AS400	SE, SSAD,
			CAD *		OOP, E/S
Digital Learning Services	Unix, Net	Oracle *, Ingres			OOP, SE
ET&T Corp. Ltd.	Unix, Net		Multimedia		MIS
Electronics Research & Development Centre				ES/9000	
Hauristix Systems Pvt. Ltd.					OOP, SE, QM
I-Mat	Unix *				
Jetking School of Electronic Tech.	Unix, Net				Robotics, PCE
Man Machine Systems					OOP, SE, E/S, AI
MicroUniv (Microland Ltd.)	Net *, Windows NT				

Table 1.10 : Special T-Schools (continued)

	Networking	Database Applications	Graphics/ CAD, multimedia	Upper End Systems	Advanced Programming
NIIT Ltd.	Unix, / C/S	Sybase, Oracle Power Builder	CAD, Multimedia	ES/9000	OOP, SE, QM, E/S
National Centre for Software Tech.	Unix, Net		Graphics, CAD		SE, AI, E/S
National Information Center (NIC)	Unix		Multimedia, CAD, SAP		E/S, PM
OMC Computer Ltd.	Unix, Net		CAD		
Onward Novell Software India Pvt. Ltd.	Net *				
Pentafour Software and Exports Ltd.		Oracle		AS400	
Real Time Info. Tech. Pvt. Ltd.	Unix	Oracle			
SQL Star People (India) Ltd.				AS400	
STG International Ltd.	Unix, C/S, Net	Oracle, Power Builder			OOP, SE
Silverline Industries Ltd.	Unix, Net	Informix *, Unify		AS400	OOP, SE
TGK (India) Ltd.		Oracle, Sybase			
Tata Information Systems Ltd.		Oracle *		AS400	
Tata Consultancy Services	C/S		CAD, SAP *		SSAD, E/S, SE
Tata Ebxsl (India) Ltd.	C/S, Net		Multimedia, Graphics		OOP, E/S, SE
Tata Unisys Ltd.	Unix, C/S, Net *	Oracle			OOP

*	Authorised Training Center	RE	Reliability Engineering	Net	Networking
C/S	Client/Server Technology	SAP	Statistical Analysis Package	PCE	Process Control Engineering
KBS	Knowledge-Based Systems	VLSI	Very Large Scale Integration	QM	Quality Management
OOP	Object Oriented Programming	AI	Artificial Intelligence	SE	Software Engineering, Tools(Case)
PP	Parallel Processing	E/S	Expert Systems	SSAD	Structured Systems Analysis and Design

SOURCE : "Special Training Schools: Powering Skills", Computer Today, July 1994, p.91.

REFERENCES

1. Bhatnagar, S.C., and Ramani, K.V., Computer and Information Management: a primer for practicing managers, 2nd edition, New Delhi, Prentice-Hall of India Private Limited, 1991.

2. Laudon, K.C., and Laudon, J.P., Management Information Systems: A Contemporary Perspective, Singapore, Macmillan Publishing Company, 1990.

3. Parker C.S., Management Information Systems: Strategy and Action, Singapore, McGraw-Hill Publishing Company, 1989.

4. Laudon, K.C., and Laudon, J.P., Op. cit.

5. Davis, G.S., and Olson, M.H., Management information systems: Conceptual foundation, structure and development (2nd ed.), New York, McGraw-Hill, 1985.

6. Robins, S.P., Organizational theory: Structure, design, and applications, NJ, Prentice Hall, 1987.

7. Miller, J.G., and Miller, J.L., "The earth as a system", Behavioral Science, 27, 1982, pp. 303-322.

8. Anthony, R.N., Planning and Control Systems:A Framework for Analysis, Cambridge, Mass.: Howard University Press, 1965.

9. Gorry, G. A., and Morton, N.S.,"Framework for

Management Information Systems", Sloan Management Review, 13 (1), 1971, pp. 55-70.

10. Keen, P.G.W., and Morton, M.S., Decision Support Systems: An Organizational Perspective, Reading, Mass., Addison-Welsey, 1978.

11. Government of India, Electronic Commission, `Manpower', Perspective Report on Electronics in India, New Delhi, June 1975, pp. 655-665.

12. "Report of the Panel on Computer Manpower Development", IPAG Journal, November 1980, pp. 55-70.

13. Department of Electronics, Annual Report: 1980-81, Government of India, New Delhi, 1981, p. 43.

14. Roy, A., "Computer Education Scenario in India", in Bhatnagar, S.C., (ed.), Information Technology Manpower: Key Issues for Developing Countries, New Delhi, Tata McGraw-Hill Publishing Company Limited, 1992.

15. Diwan, P.,"Business of Computer Training", Information Technology, May, 1993, pp. 48-49.

16. Singh, R., and Bhatia, G., "Computer Training Syndrome", Telematics India, August, 1993, pp. 16-28.

17. Vittal, N., " The DOEACC Scheme: In Search of Excellence", Computer and Communication, June 1992, pp. 66-71.

18. Raman, R., "Computer Courses: A Wholesale Business", Dataquest, 12 (6), 1994, pp 84-98.

19. ibid.

20. "Special Training Schools: Powering Skills", Computer Today, July 1994, pp. 83-114.

CHAPTER TWO

LITERATURE REVIEW

CHAPTER - 2

LITERATURE REVIEW

The purpose of this chapter is to introduce the reader with existing studies pertinent to earlier research and how they relate to this study.[1] Care has been taken while scanning various sources of information with the view to enrich the literature with relevant and latest information. This chapter is divided into five sections. The first section deals with importance of training in information system development. Second section looks at the status of training and development in India. The third section concentrates on training and development in future. The fourth section reviews different aspects of end-user computing. The final section reviews literature related to attitude and involvement of users and its effect on information system success.

2.1 IMPORTANCE AND NEED OF TRAINING IN INFORMATION SYSTEM DEVELOPMENT

The development of progressive ideas in the sphere of adult education has strongly influenced the field of training and

development. Adult learning is more complicated than children or animals as scientific studies require strict control of variables that is not always possible in case of adults.

The three schools of thought that have strongly influenced training, education and development in organisations are progressive adult education, behavioral adult education, and humanistic adult education.

The progressive adult education movement advocated more individual involvement in the learning process than was found in earlier schools of thought. This school of thought gained popularity during 1921 to 1961 as more and more organisations started realising the importance of training.[2] This school of thought was built on the notion that people can be trained to "participate actively in the learning experience and to assume responsibility for the success of the program...., in this training, persons, not subjects are taught.....the nature of the learner is explored..... relationships are forged with fellow learners, and the subject matter is treated in a different light."[3]

Behaviour adult education movement has also influenced the training strategy in organisations.[4] This school emphasises upon identifying the essentials of learning and then measuring the change in behaviour, a basis for accountability. The role of the teacher or instructor is to provide evidence regarding quality of learning and producing the responsibility for the results.[5]

Carroll A. Londoner[6] explicitly sums up the stages that are involved in this type of learning.

Need - the explanation of the need and problem the programme is trying to satisfy.

Objectives - the statement and definition of the objectives in terms of measurable goals.

Constraints - limitation or restriction that must be satisfied by the system before reaching the desired goals.

Alternatives - the possible approaches for attaining the desired goals.

Selection - the analysis and evaluation of alternatives in light of desired goals and possible restrictions.

Implementation - the adoption of selected alternatives to meet the desired goals.

Evaluation - the assessment of system performance in light of specified objectives.

Modification - the process of altering the designed system to meet the deficiencies in the stated objectives.

Another school of thought that has had a direct influence on organisational training is the humanist adult education system. This school of thought is based on self-initiated learning; group methods of learning; students' participation in each stage of training from planning to evaluation; and the teacher as a facilitator.

Carl Rogers[7] work highlights the significance of freedom and independence for an individual to develop the ability to be proactive rather than reactive. Carl Roger believes on the learning process that places a strong trust on the responsibility of the leaner. Both A.H. Maslow and C. Rogers support the idea that educators "should foster self-actualizing and fully-functional individuals."[8]

Within the humanistic adult education school Malcolm Knowles introduced the idea of andragogy "the art and science of helping human beings to learn."[9] The emphasis here is on the learner and development of human beings. While addressing on adults, Knowles calls for a "technology for teaching adults that is distinguishable from teaching children."[10] Malcom Knowles[11] andragogical theory of adult learning is based on the following assumptions:

- As people grow, they move from total dependency to increasing level of self-directedness.
- As an individual grows and matures he relies less on traditional method of teaching and more on experimental techniques that utilize the experiences of learners such as field experience, group discussion etc.
- As a person matures, his readiness to learn is less dependent on biological development and more dependent on developmental tasks required for the discharging of emerging social roles.
- A child learning is subject-oriented while adult tends to be problem-oriented.

Patricia Cross[12] in her Chain-of-response (COR) Model has developed a method that an adult educator may use for

identifying how adult learners take decisions whether to participate in learning activities. This model is important, because for an effective training programme learner participation and involvement in organisational training is necessary.

Patricia Cross suggested several methods that can be used for increasing adult participation and involvement in learning. Some important ones are

- self-directed learning projects,
- televised course materials,
- competency based learning.

J. Farmer, A. Buckmaster, and B. LaGrande[13] developed a model called Situation-Specific Approach. This model can be utilised by the trainers and adult educators to find out which approach is most appropriate to teach adults in a particular situation. This model requires an assessment of:

- situation involved in the training,
- the assumed value of the adult education,
- the people who are involved,
- the requirement of the learner, and
- the role of the trainer.

In a Delphi survey, Lucy Guglielmino[14] identified the presence of attitudes, abilities and personality characteristics as important for self directed learning to take place and be effective. To measure this, Self Directed Learning Readiness Scale (SDLRS) was developed by Lucy M. Guglielmino. The Scale includes the following factors which are related to self-directed learning.

- love of learning,
- self-concept as an effective, independent learner,
- tolerance of risk, ambiguity and complexity,
- creativity,
- view of learning as a lifelong and beneficial process,
- initiative and self discipline in learning,
- knowledge of learning needs and progress, and
- acceptance of responsibility for one's own learning.

Lucy Guglielmino and Paul Guglielmino[15] have further identified factors that may be essential for development of self-directed learning in an organisation; research findings favouring the need for self directed learning in organisations; and proposed a model for training and development programmes in organisations. They believe that "those employees who have learned how to learn will be in a best position to maintain or improve their job status and

adapt to the change which is inescapable."[16] Growing importance of self-directed learning in organisations as Information Age continues to unfold itself has also been recognised by R. Naisbitt [17] and A. Toffler.[18]

Apart from user involvement in installation and conversion activities training provides an additional opportunity for users to participate in information system development process. The significance and importance of user training in the successful development and implementation of information system has been acknowledged by many academicians and practitioners in the literature related information system such as A. Rushinek and S.F. Rushinek,[19] N. Pliskin,[20] R. Kraut, S. Dumais, and S. Koch[21], A.K. Baronas and M.R. Louis[22], D.L. Amoroso[23], J. Miller and B.A. Doyle.[24]

According to R.R. Nelson and P.H. Cheney[25] training is crucial for system integration. J.F. Rockert[26] finds user education and training to be a critical function of MIS department. L. Mohan and S. Belardo[27] asserts that planned training methodology played a vital role in the successful adaptation of information technology by end-users.

L.E. Raho, J.A. Belohlav, & K.D. Fiedler[28] found a positive correlation between successful assimilating PC technology and overall level of educational activity undertaken by the firm. J.D. Lees,[29] found a similar relationship between training and successful implementation of small business information systems. In organisational development literature, the importance of training and education is recognized for preparing an organisation for a change or in realizing the change itself.[30]

One of the major problem and difficulty with the existing information systems, is the lack of training asserts M. Major.[31] According to R. S. Pawar[32] it is necessary to understand the new emerging roles of Active end-users, Defacto end-users and Functional specialist end-users in terms of numbers and training needs (qualitative aspect).

J. Ward, P. Griffits and P. Whitemore[33] the most important issues facing information technology are lack of skills, quality of users staffs, quality of data processing staff and training of developer and users.

2.2 TRAINING AND DEVELOPMENT IN INDIA

M.S. Saiyadain[34] in a study funded by IIMA surveyed 49 companies and provided an overall picture of the training function in India. The main findings are as follows:

- One third of the organisations have separate training department under managers who are professionally trained,
- Those organisations that do not have separate units, their training department are managed by non-professionals.
- Only few of the organisations having training department had good infrastructure facilities and teaching facilities of their own. Most of the organisation depends on others for training.
- Only 0.017 percent of the total budget on human resources is spent on training.
- In majority of the cases training needs are identified on the basis of annual appraisal, growth and diversification of business. Few organisations take the help of external consultants in identifying training needs. The training needs of the supervisors are identified through appraisal feedback and that of worker on the recommendation of supervisors. In 42.8

percent of the case mangers themselves identify their training requirement.

- More than two third of the organisations have induction training for managers, supervisors, and workers.
- For workers internal faculty is the major source for training and for managers it is external faculty that plays a major role.
- Managers are sponsored to external programme more than supervisors and workers.
- Most organisations take post training feedback and evaluation seriously.

T.V. Rao and E. Abraham S.J.[35] conducted a survey covering 53 companies in mid-1984 and found training to be the most frequently used HRD mechanism in the country. The main findings of the study were:

- training is not properly exploited as organisations completely ignore the need for post training follow up,
- 55 percent of the organisations surveyed had formal policy on training,

- 79 percent of the organisation had in-house facility for training,
- 81 percent of the organisation conducted training programme regularly for executives,
- 84 percent had separate budget for training,
- 81 percent made new employees in supervisory/managerial cadres go through induction programme.
- 88 percent encouraged executives to attend outside programmes without objection
- in 39 percent of the companies people were trained for the job before promotion.

K. Bannerji[36] collected data on supervisors who had undergone training and found that it had little or no impact on their effectiveness. However, most of them felt that training did improve their self-confidence, motivation, and communication ability. B.L. Maheshwari[37] collected data on 999 respondents from banking institutions and found training programmes less effective with respect to their contribution to job performance, However, they did endorse the usefulness of formal training

S.K. Bhatia[38] saw a shifting of the main objective of training from knowledge to attitude. According to him the areas that need training are:

- technical skills, and knowledge,
- knowledge of organisation and external systems,
- conceptual and interpersonal skills.

According to him the emphasis on these three must vary based on the level of employees. Training of workers should concentrate on technical skills and knowledge followed by conceptual and interpersonal skills, and knowledge of organisation and external systems. While in the case of supervisors, conceptual and interpersonal skill should be stressed, followed by technical skills, and knowledge of organisation and external systems. For managers, focus should be on conceptual and interpersonal skills, followed by knowledge of organisation and external systems and technical skills and knowledge.

In 1982 M.C. Agarwal[39] studied a group of graduate engineering trainees in three large public sector organisations and found that the perception of the trainees regarding the method and the content of the training was discouraging and dissatisfying

After administrating a seventy-two item questionnaire on 119 personnel managers P. Seth[40] suggested that the aim of training programs directed towards personnel managers should be addressed towards attitude and belief underlying managerial philosophy and their inter-relatedness.

K.K. Jain[41] collected data on 119 managers in the steel industry who had attended training programs - both external and in-house. He found that a majority of the respondents were satisfied with the size of training group and training duration.

D. Sinha[42] suggested that training can show visible and effective results. And depending upon the nature of training participants could be helped to improve upon existing qualities and develop new skills.

N.N. Chatterjee[43] mentioned different types of training programmes in India

- Induction training and under-study system. In induction training new entrants are introduced to the organisation, rules, service conditions etc. Under-study system popular in Government undertakings. In

this, an employee works with his prospective senior as under-study.

- Supervisory training in which technical skills are imparted to supervisors.
- Technical training used in case of new entrants for operational requirement and for improving the skills of existing employees for promotions etc.
- Management development in which managers are trained in analytical and decision making skills, values and attitude.

C. Gopalkrishna and S. Achuthan[44] requested 39 executives from approximately 25 companies to rank different training programmes according to the requirements of the organisations. The executives ranked them as follows: The first rank was given to programmes that focused on attitude and behaviour of participants, the second rank was given to programmes focussing on strategic decision making, analytical ability etc., the third rank was given to training programmes devoted for broadening the knowledge area, and finally the programmes that highlight government policy in the area of interest.

M.S. Saiyadain[45] highlighted the problem of faculty, participants, and administration in implementation of training programmes.

P.K. Srinivasan and B.R. Virmani,[46] found lack of seriousness on the part of the participants and different expectation form training as major problems in training.

Regarding the methodology of training different views exist among writers and researchers. According to M.M.A. Bhasha[47] in India, lecture cum discussion method is better than business game T-Groups, case methods and workshops. C.K. Prahlad and K.M. Thiagarajan[48] recommended structured exercises to be followed in training of employees.

2.3 TRAINING AND DEVELOPMENT IN FUTURE

Literature focusing on modification in training environment began to emerge in the 1980's. James Schreier[49] findings support the awareness for development of self-directedness in learning among the employees. The following are some perceived impacts on the future of training and development as listed by the subjects in Schreier study:

- massive need for retraining and cross-training,

- need for training and development of professional to be resource specialist, and
- more computer-assisted training and self-directed learning.

Schreier's research also focused on the type of learning that will be needed in the workplace of the future. According to him the future training and development programmes must be based on individual needs rather than group needs; more specific tailoring of programmes will be required; training and development services must be more flexible in design and delivery; and finally a need for "Cafeteria style" of learning by which employees will be able to choose their time, schedule and location to undergo training and education rather than being placed in a set of curriculum.[50]

Tom Peter[51] identifies ten important factors that may be taken into consideration for developing training system for the future. These factors are:

1) extensive entry-level training focusing on exactly the skills in which the organisations want to be distinctive,
2) treating employees as potential career employees,

3) regular retraining,

4) generously expending both time and money to training,

5) promoting and nurturing on-the-job training,

6) understanding the fact that there is no limit to the skills that can be profitably taught to everyone,

7) using the training to herald a commitment to a new strategic trust,

8) stressing on training at the time of crises,

9) strengthening line-driven training,

10) using training to teach the organisation's vision and values.

L.M. Guglielmino and P.J. Guglielmino[52], propose development of organisational learning resource centers to meet the emerging needs of the Information Age in the years to come. These resource centers may offer different resources for self-directed learning for employees such as:

- audio-visual materials catalogued by topic,
- computer assisted reading materials,
- self-teaching texts,
- indexes of individuals within the organisation who have specific expertise in the topic area,
- facilities conducive to learning such as meeting room, video materials etc.

William Bridges [53] has addressed the need for various types of training and development required by the organisations as they adapt to changing environment, this includes new skills and knowledge needed for fresh types of roles, ability to visualize and understand things in new and different situations, understanding of how employees will have to behave and develop different attitudes to meet the changes, and training in techniques for handling self doubts.

Many others like Amir Levy [54] has focused on the need of planned change. Louise Lovelady [55] has highlighted the need for an open climate in an organisation, with supportive relationships and a participative style of management for training to be more effective.

2.4 END-USER COMPUTING

2.4.1 Growth of end-user computing

During the early days of computerisation, end-users rarely interacted with computer system at all. This was because computing environment in those days was user-hostile. The need of the users had to be translated into programmes by

the programmers as emphasis was on third generation language and low-level languages. In 1970's with the introduction of minicomputers, direct involvement of end-users in computing activities started taking place.[56] In recent past end-user computing has experienced a rapid growth in India.[57] S.K. Sharma,[58] J.F. Rockart and L.S. Flannery,[59] and J. Martin[60] have given several reasons that have lead to an increase in end-user computing. They are:

- increase in computer literacy of end-users,
- proliferation of PC's in organisations,
- development of non procedural languages,
- development of user-friendly software,
- improved hardware technology,
- increased complication in business conditions,
- bottleneck and backlogs in development of applications by MIS departments,
- realization of the potential advantages of computer based tools, and
- inability of MIS department to respond satisfactorily to the needs of the users.

2.4.2 End-users Types

The term end-users have been defined in number of ways. J. Martin [61] classified the end-users into two categories. The first type of end-users according to him are those who use applications created by others but they themselves do not develop applications. The second type of end-users are those who develop their own application and also use applications created by others.

E.E. Tozer[62] categories end-users in four types, they are Manager, Specialist, DP specialist and Clerical. Each of these was further divided into expert users and causal users.

J.F. Rochkart and L.S. Flannery [63] identified six types of end-users in organisations, after conducting research on 200 end-users and 50 Information Services Managers. These were:

a) Menu Driven End-users(Non-Programming End-users) - imply those types of end-users who use someone else's software through pre-established procedures or menus. They do not generate programs nor use report

generators and fall in the category of non-skilled end-users.

b) Command Level End-users - imply those types of end-users who are able to generate simple inquiries, perform calculations and create simple reports and documents. They can manipulate information by using report generators and fall in the category of semi-skilled end-users.

c) Programming End-users(End-user Programmers) - imply those types of end-users using both command and procedural languages. They develop their own applications to be used by themselves or by others and fall in the category of skilled end-users.

d) Functional Support Personnel - imply those types of end-users who support and assist other end-users in their own functional area. They never count themselves as computer professionals. They have experience in vast range of software tools and by virtue of this power in end-user languages, have become informal EDP centres within the organisation.

e) End-users Computing support Personnel - imply those end-users who are located in Information Center and who are well-versed in end-user language. They aid and

assist end-users or develop applications software for them.

f) Data Processing Programmers - They are basically programmers except that most of their effort is directed towards end-users language.

According to J.F. Rockart and L.S. Flannery, in PC environment, the most common type of end-users were Programming End-users constituting 30 percent followed by command level end-users making up 29 percent of the population.

2.4.3 End-users computing management and control

There are three principle approaches to management of end-user computing according to T.P.Gerrity and J.F. Rockhart[64]

- the monopolist approach,
- the laissez-faire approach, and
- the information center approach.

In monopolist approach various types of control mechanisms are developed and end-user computing is completely controlled by the MIS department. M. Alavi and I.R. Weiss[65] suggested number of control mechanisms:

- cost/benefit analysis for controlling inefficient use of capital,
- setting of hardware and software standard to control compatibility of tools and threats to data security,
- user training to avoid unrealistic and sketchy analysis, and
- involvement of computer professional in technical reviews to avoid using of wrong models, working out wrong problems and mismatching of tools and applications.

In laissez-faire approach end-user computing is left completely to the discretion of the end-users themselves. In this economy of scale cannot be realised as that in centralised purchasing. Further, shared knowledge is impossible in this approach. Despite many drawbacks this approach is feasible during the early stage of end-user computing in the organisation.[66]

Information center approach is the latest approach. In this approach the end-users are allowed to retain the autonomy to care for their own needs but some controls are exercised over them to arrest uncontrolled proliferation of end-user system.

R.L Leithesiser and J.C. Wetherbe have identified strategies for management of end-user computing in organisations, They are:

- stressing of efficient use of computer resources,
- allowing development to occur only in critical area of business,
- encouraging development based on incentives,
- adoption of laissez-faire strategy for allowing end-users to develop and maintain their own environment, and
- establishment of Information Center with the aim of facilitating and coordinating end-user computing by offering support service.

2.4.4 Information Center

The concept of information center "evolved from the need to help end-users and end-user department, learn about and take advantage of decision support resources."[68] The aim of the Information Center according to E.E. Tozer[69] is to provide the tools, furnish resources, and equip the end-users with the techniques and environment to make end-user computing widespread, viable, effective, efficient and self sufficient as possible. He also divided the functions and

the role of information system into two: Primary - active and Passive - reactive. According to him the primary functions are:

- to deliver or organize training on a wide range of topics,
- application prototype, i.e. fostering on site development,
- requirement recognition, preliminary allocation of design development and operational responsibility,
- installation and maintenance of approved systems,
- assimilating and disseminating experience from other comparable sites,
- advocating end-user computing,

While passive functions of information center are:

- advising and consulting users concerning services and opinions,
- hotline service,
- administrating and security/access control,
- data administration,
- system certification.

L.W. Hammond[70] has suggested following strategies for Information Center:

- for decision making and organisational support provide a set of packaged tools,

- make hardware accessible to users,
- information analyst or consultants in information center should provide help to end-users in formulating an approach, and
- user should be trained in the use of support packages.

T.P. Gerrity and J.F. Rochkart[71] have highlighted some problems in the implementation of an Information Center.

- centralised nature of Information center,
- lack of application knowledge of support staff,
- managing reactively rather than proactively,

According to them the need of the hour is that the Information Center must come out from their passive role and become more dynamic, active and assertive.

2.5 ATTITUDE AND INVOLVEMENT OF USERS AND INFORMATION SYSTEM SUCCESS

Attitude refers to a mental state of users, i.e., their attitude or outlook toward a product or process. Involvement on the other hand refers to the observable or noticeable behaviour of users in development activities.

According to B. Ives and M. H. Olson "It is almost an axiom of the MIS literature that user involvement is a necessary condition for successful development of computer based information systems."[72]

The idea that people is the weakest portion in computer system[73] and that information system development and implementation process has a potential for people problem[74] is not new to information system literature.

According to M.J. Ginzberg[75] each user is an individual and has his or her own need and goals and therefore it is an error to assume that users are homogeneous. This notion has been supported by others also like T. Kochan, J. Cutcher-Geshenfeld, and J.P. McDuffie,[76] D. Levine and G. Strauss, [77] and D. Levine and L.D. Tyson.[78] J.A. Senn's[79] asserts that basic guidelines should be to fit the system to user rather user to the system.

Using a model as a framework, and examining over one hundred empirical studies, R.W. Zmud[80] asserted that individual difference (demographics) inspire user attitude, which in turn affect the involvement of users in

information system development and implementation, thus affecting the information system success.

Similarly, B. Ives and M.H. Olsan[81] examined about two dozen studies, which aimed on user involvement and information system success, and developed a descriptive model for user involvement shown in Figure 2.1 below

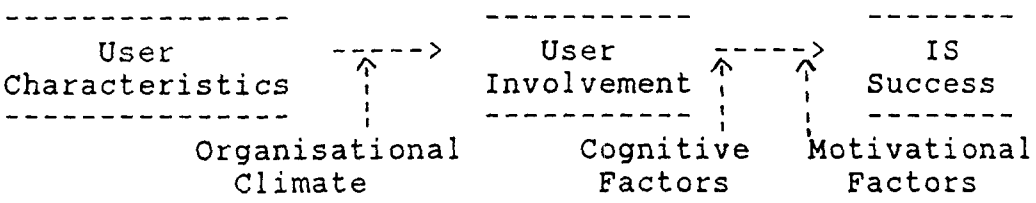


Figure 2.1: Descriptive model of user involvement (Adapted from Ives and Olson, 1984, p-588)

The model acknowledges the importance of individual differences, as well as motivational factors and organisational climate in information system success. B. Ivens and M.H. Olson described cognitive and motivational factors as "intervening mechanisms".

H.C. Lucas, E.J. Walton, and M.J. Ginzberg[82] in a study of implementation of packaged software systems, found that computer skills of users and their earlier experience with computers have a positive correlation with their

satisfaction with information system as well as their satisfaction with its installation.

The importance of user involvement for the success of information system has been acknowledged by many. R.F. Powers and G.W. Dickson[83] asserted that user participation is crucial for the success of MIS project.

B. DeBrabander and A. Edstron,[84] declared that in relation to other factors like top management support, quality of EDP staff etc., user involvement is the only one that is invariably related to the quality of the final outcome.

According to H.C. Lucas a "change approach based on user participation is most likely to be successful."[85]

R. J. Welke[86] states that to avoid implementation failure we require a system development process and an approach that take users into consideration from the beginning.

In the study conducted by M.J. Cerullo[87] it was found that involvement of operating and middle management in development in terms of definition and installation

activities was a critical success factor, second only to user attitude and quality of EDP personnel.

C.R. Franz and D. Robey[88] found a moderate relationship between user involvement and perceived usefulness of information systems. They found a correlation of 0.33 between involvement of users in definition phase and user perceived usefulness of the information system and a correlation of 0.24 between involvement of users in installation phase and user perceived usefulness of the information system.

W.J. Doll and G. Torkzadah[89] found an overall correlation between perceived involvement and end-users computing satisfaction.

In this dissertation attitude refers to a mental state of users, i.e., their attitude or outlook toward training and development and the extent of their involvement in training and development activities. Involvement on the other hand refers to the observable or noticeable behaviour of users training and development activities.

REFERENCES

1. Isaac, Stephen and Michael, William., Handbook in research and evaluation, 2nd edition, San Diego, California, Edits Publishers, 1981.

2. Knowles, Malcolm., The history of adult education movement in the United States, (rev. ed.), New York, Krieger, 1977.

3. Bergevin, Paul., A philosophy for adult education, New York, Seabury, 1967.

4. Skineer, Burrhus F., Beyond freedom and dignity, New York, Alfred A. Knopf, 1971.

5. Popham, W. James.," The new world of accountability: In the classroom", in Decarlo, J and Mason, C.(eds.), Innovations in education for seventies: Selected readings, New York, Behavioral Publications, 1973.

6. Londoner, Carroll A., "The system approach as an administrative and program planning tool for continuing education", Educational Technology, 1972, pp. 24-30.

7. Rogers, Carl R., Freedom to Learn, Columbus, Ohio, Charles E. Merrill, 1969.

8. Elias, John L. and Merriam, Sharan., Philosophical foundations of adult education, Malabar, Florida, Robert E. Krieger Publishing Company, 1984.

9. Knowles, Malcolm., The modern practice of adult education: Andragogy versus pedagogy, New York, Association Press, 1970.

10. ibid.

11. Knowles, Malcolm., The Adult Learner: A neglected Spiecies, Houston, Texas, Gulf Publishing, 1973.

12. Cross, K. Patricia., Adults as learners; Including perceptions and facilitation learning, San Franciasco, Jossey-Bass, 1981.

13. Farmer, J., Buckmaster, A., and LaGrand, B., "Situational specific approaches," Lifelong learning: An amnibus of practice and research, 12(3), 1988, pp. 8-13.

14. Guglielmino, L.M.,Development of the Self-directed Learning Readiness Scale, Unpublished Doctoral Dissertation, University of Georgia, 1977.

15. Guglielmino, Lucy M. and Guglielmino, Paul J., "Self-directed learning in business and industry: An information age imperative." in Long, H. B.,(ed.) Self-directed learning: Application and Theory, Georgia, University of Georgia, 1988.

16. ibid.

17. Naisbitt, R., Megatrends, New York, Waner Books, 1982.

18. Toffler, A., The third wave, New York, Bantam Books Inc., 1980.

19. Rushinek, A. and Rushinek, S.F., "Training Software (TS) case study: Feature selection systems (FSS) for

computer personnel," Computer Personnel, 1989, 12(1), pp. 13-20.

20. Pliskin, N., "Human resource management: Guidelines for effective introduction of microcomputer technology", Journal of Information System Management, Spring, 1989, pp. 51-58.

21. Kraut, R., Dumais, S., and Koch, S., "Computerization, Productivity, and quality of work-life", Communication of the ACM, 32(2), 1989, pp. 220-238.

22. Baronas, A.K., and Louis, M.R., "Restoring a sense of control during implementation: How user involvement leads to system acceptance", MIS Quarterly, 12(1), 1988, pp. 111-126.

23. Amoroso, D. L., "Organisational issues of end-users computing", Database, 19(3/4), 1988, pp. 49-58.

24. Miller, J. and Doyle, B.A., "Measuring the effectiveness of computer-based information systems in financial service sector", MIS Quarterly, 11(1), 1987, pp. 107-124.

25. Nelson, R.R. and Cheney, P.H., " Educating the CBIS user: A case analysis", Data Base, 18(2), pp. 11-16.

26. Rockart, J.F., "The line takes the leadership - IS management in a wired society", Sloan Management Review, 29(4), 1988, pp. 57-64.

27. Mohan, L. and Belrado, S., "A Contingency Approach to Managing Information Technology in Developing Nations: Benefiting from lessons learned in Developed Nations", in Bhatnagar, S.C. and Bjorn-Anderson, N. (eds.), Information Technology in Developing Countries, North Holland, 1990.

28. Raho, L.E., Belohlav, J.A. and Fiedler, K.D., "Assimilating new technology into the organisation: An assessment of McFarlan and McKenney's model", MIS Quarterly, 11(1), 1987, pp. 47-57.

29. Lees, J.D., "Successful development of small business information systems", Journal of Systems Management. 38(8), 1987, pp. 32-39.

30. Argyris, C., Organisation and Innovation, Illinois, Richard D. Irwin, Inc., and the Dorsey Press, 1965.

31. Major, M. "DSS embracing new environments", Software News, 5(9), 1985, pp. 41-50.

32. Pawar, Rajendra S.,"IT Manpower in India: The Burning Issue", in Bhatnagar, S.C.(ed.) Information Technology Manpower, New Delhi, Tata McGraw-Hill Publishing Company Limited, 1992.

33. Ward, J., Griffits, P., and Whitemore, P., Strategic Planning for Information System, Chichester, John Wiley and Sons, 1990.

34. Saiyadain, Mirza S., "Training Functions in India". Indian Journal of Training and Development, 17(2), 1987, pp. 3-23.

35. Rao, T.V. and Abraham, E, S.J., "Human Resource Development Practices in Indian Industries: A Trend Report", in Rao, T.V., and Pereira, D.F. (eds.), Recent Experiences in Human Resources Development, New Delhi, Oxford & IBH Publishing Co., 1986.

36. Banerji, K., " Evaluation of training- A study of supervisory development", Indian Journal of Training and Development, 11(4), 1981, pp. 150-155.

37. Maheshwari, B.L., "Formal training, skills development and job performance", ASCI Journal of Management, 11(1), 1981, pp. 28-38.

38. Bhatia, S.K., "Trends in Training and Development", Indian Journal of Training and Development, 11(4), 1981, pp. 142-145.

39. Agarwal, M.C.,"Training of graduate engineer trainees", Indian Journal of Training and Development, 12(3&4), 1982, pp. 17-18.

40. Seth, P.,"Impact of Training on personnel managers", Productivity, 25(2), 1984, pp. 207-216.

41. Jain, K.K., "Training and development in public enterprises - A case study of Indian Iron and Steel Industry", Lok Udyog, 18(11), 1985, pp. 21-27.

42. Sinha, D., "Attitudinal changes in training programme", Indian Journal of Training and Development, 14(2), 1984, pp. 66-69.

43. Chatterjee, N.N., Management of Personnel in Indian Enterprises: concepts, Practices and Emerging Trends, Calcutta, Allied Book Agency, 1978.

44. Gopalkrishnan, C. and Achutan, S.. "Focus on Training programmes" Financial Express, August 28, 1985, p. 4.

45. Saiyadain, M.S., Training in public enterprises: Problem and suggestions", in Ravinder, S. and Mishra, R.K. (Eds.), Educational and Training of Public Enterprise Personnel, New Delhi, Oxford and IBH Publishing Co., 1984.

46. Srinivasan, A.V. and Virmani, B.R., "Action learning programme", Lok Udyog, 11(1), 1977, pp. 9-18.

47. Basha, M.M.A., "Training techniques in varying cultures: American methods for India" Integrated Management, 59, 1971, pp. 43-48.

48. Prahalad, C.K. and Thiagarajan, K.M.,"Human relations training in India", ISTD Review, 1(6), 1971, pp. 19-23.

49. Schreier, J., "Megatrends for training and development: Direction for the future." Address delivered to the American Society for Training and Development National conference and Exposition, Dallas, Texas, May, 1984, pp. 15.

50. ibid.

51. Peter, T., Thriving on chaos: Handbook for a management revolution, New York, Alferd A. Knopf, 1987.

52. Guglielmino, Lucy M. and Guglielmino, Paul J., Op.cit.

53. Bridges, William., Surviving corporate transitions, New York, Doubleday, 1988.

54. Levy, Amir., "Second order planned change: definitions and conceptualization", Organisational Dynamics, 1988, pp. 5-20.

55. Lovelady, Louise., "Change strategies and the use of OD consultants to facilitate change", LODJ, 5(2), 1984, pp. 3-9.

56. Parker, Charles S., Management Information Systems: Strategy and Action, Singapore, Mc-Graw Hill Book Co., 1989.

57. Sharma, S.K.,"Changing dimensions of MIS: and end-user computing", Indian Management, Feb-March, 1993 pp. 7-23.

58. ibid.

59. Rockhart, J.F., and Flannery, L.S., "The Management of End User Computing", Communications of the ACM, 26, 1983, pp. 776-784.

60. Martin, J., Application Development without Programmers, New Jersey, Prentice-Hall, 1982.

61. ibid.

62. Tozer, Edwin E., Planning for Effective Business Information Systems, Oxford, Pergamon Press, 1988.

63. Rockhart, J.F., and Flannery, L.S., "The Management of End User Computing", Communications of the ACM, 26, 1983, pp. 776-784.

64. Gerrity, Thomas P., and Rochart, J.F., "End-User Computing: Are you a Leader or a Laggard?", Sloan Management Review, 28(4), 1986, pp. 25-34.

65. Alavi, M., and Weiss, I.R., "Managing the Risks Associated with End-User Computing", Journal of Management Information Systems, 2(3), 1986, pp. 5-20.

66. Parker, Charles S., Op. cit.

67. Leithesiser, R.L., and Wetherbe, J.C., Avoiding the Pitfall of End-User Computing, (MISRC-WP-85-09), Management Information Systems Research Center, School of Management, University of Minnesota, 1984.

68. Parker, Charles S.. Op cit.

69. Tozer, Edwin E., Op. cit.

70. Hammond, L.W., "Management Considerations for an Information Center", IBM System Journal, 21, 1982, pp. 131-161

71. Gerrity, Thomas P., and Rochart, J.F., Op. cit.

72. Ives, B., and Olson, M.H., "User involvement and MIS research: A review of research", Management Science, 30(5), 1984, pp. 586-603.

73. Mumford, E., and Banks, O., The computer and the clerk, Slasgow, England, The Villafield Press, !967.

74. Jones, M. and McLean, E., "Management problems in large-scale software development projects", Industrial Management Review, Spring, 1970, pp. 1-15.

75. Ginzberg, M.J., "Steps toward more effective implementation of MS and MIS", Interfaces, 8(3), 1978, pp. 57-63.

76. Kochan, T., Cutcher-Geshenfeld, J., and McDuffie, J.P., Employee participation, work redesign and new technology: Implications for public policy in 1990's, Submitted to Commission of Workforce Quality and Labour Market Efficiency, Washinton, DC.,1989.

77. Levine, D. and Strauss, G., Employee participation and involvement, Berkeley, California, University of California, 1989.

78. Levine, D. and Tyson, L.D., Participation,

productivity, and the firm's environment, Berkeley, California, University of California, 1989.

79. Senn, J.A., " A management view of system analysts: Failures and shortcomings", MIS Quarterly, 2(3), 1978, pp. 25-32.

80. Zmud, R.W., "Individual differences and MIS success: A review of the empirical literature", Management Science, 25(10), 1979, pp. 966-979.

81. Ives, B., and Olson, M.H., "User involvement and MIS research: A review of research", Management Science,30(5), 1984, pp. 586-603.

82. Lucas, H.C., Walton, E.J., and Ginzberg,M.J., "Implementing packaged software", MIS Quarterly, 12(4), pp. 537-550.

83. Powers, R.F., and Dickson, G.W., "MIS project management: Myths, opinion and reality", California Management Review, 1973, 15(3), pp. 147-156.

84. DeBrabander, B., and Edstron, A., "Successful information systems development projects" Management Science, 24(2), 1977, pp. 191-199.

85. Lucas, H.C., Information system concepts for Management, New York, McGraw- Hill, 1978.

86. Welke, R.J., "User-oriented approaches to MIS", CA Magazine, 112(8), 1979, pp. 62-68.

87. Cerullo, M.J., "Information Systems success factors", Journal of System Management, December, 1980, pp. 10-19.

88. Franz, C.R., and Robey, D., "Organizational context user involvement and the usefulness of information systems" Decision Sciences, 17, 1986, pp. 329-356.

89. Doll, W.J., and Torkzadah, G., " End-user computing involvement: Discrepancy model", Management Science, 35(10), 1989, pp. 1151-1171.

CHAPTER THREE

RESEARCH METHODOLOGY

CHAPTER - 3

RESEARCH METHODOLOGY

In this chapter different aspect of research methodology in connection with the study is presented. This chapter is discussed under the following sections and sub-sections beginning with the need for the study followed by; the statement of the problem; operational definitions; research questions; research hypotheses; research design; population and sample; data collection method; analysis and interpretation of data; and limitation of the study.

3.1 NEED FOR THE STUDY

India is going through information revolution thus making the information system a subsystem of a larger organisation.[1] The computer is increasingly becoming an integral part of Indian corporate life - despite the infra-structural deficiencies that are a reality in India.[2] To enhance the effectiveness of information system is to improve the skills of the systems users, specially those members of the organisation who are non information system personnel. These non computer professionals using computers

are called end-users.

The need of end-users, for increased level of skills, to do their jobs more effectively presents a challenge for training and development (T&D) professionals today.[3] In organisational development literature, the importance of training and education is recognized for preparing an organisation for a change or in realizing the change itself.[4] According to R.R. Nelson and P.H. Cheney, training is crucial to system integration.[5] Many others like J.F. Rockart[6] finds user education and training to be a critical function of MIS department. L. Mohan and S. Belardo[7] asserts that planned training methodology played a vital role in the successful adaptation of information technology by end-users. L.E. Raho, J.A. Belohlav, & K.D. Fiedler[8] found a positive correlation between successful assimilating PC technology and overall level of educational activity undertaken by the firm. J.D. Lees,[9] found a similar relationship between training and successful implementation of small business information systems.

One major problem with the existing information systems, is the lack of training[10] and the quality of training. Out of approximately five thousand computer training

institutes in India, majority of them have no contact with the needs of the market.[11] "This aspect of the industry's need, not matching the skills learned at the institute, is an issue that has been dogging the information technology industry for a while."[12] Despite the importance of training of end-users, there has been little empirical research in this area. Therefore, it is necessary to understand the new emerging roles of end-users in terms of numbers and training needs (qualitative aspect).[13]

It is the positive correlation between assimilation of PC technology and educational activity undertaken by the firm that has motivated the researcher to take up this study. After detailed literature survey and discussions with experts in the area, it was found that there is a need to evaluate how the end-users are being trained, and how they are participating in training and development (T&D) activities. This is because the level of participation of end-users in training and development (T&D) activities have a direct bearing on the success of information system. Further, this also augments self - directed learning in business and industry that is becoming a common place in the changed information age.[14]

3.2 STATEMENT OF THE PROBLEM

This study addresses to the lack of research, on training and development (T&D) activities, among the current populations of end-users. With the rapid changes in the information systems, the information systems professionals in the corporation are now clearly in minority, surrounded and out numbered by end-users. For successful assimilation of information technology there is a need for end-users to expand their existing knowledge base constantly. This wider access of technology to the end-users is increasing the demand for training. Making it difficult for information system specialists to carry the entire burden of the end-users training and development (T&D) activity.

An element that further complicates the problem is the high turnover among information systems professionals.[15] Further, due to shortage of computer professionals the organisations are not always willing to relieve them for training and development activities. With information system support request backlog and dramatic rise in the acquisition and use of computers, it implies that end-users employ a variety of learning techniques to meet their literacy demand. One alternative to overcome this problem is to

develop trainers from within the end-users. According to Parker "One common training objective is to concentrate efforts on identifying and teaching functional support personnel - enthusiastic and computer - literate end-users who are likely to assist other end-users."[16]

Information systems professional should concentrate on training end-users in the tools and techniques so they can pinpoint and solve their own problems.[17] To achieve this objective the Information systems professionals have to involve end-users in training and development activities. This is because the professionals are strong on technological and software product knowledge but most of them do not have the functional and application knowledge that is a main concern for the end-users.[18]

Before embarking on this innovative training method, it is important, for industries and trainers to understand where they are currently. After detail literature examination and discussions with the experts in the area, it emerged that there is a need to collecting information on:

a) end-users extent of involvement in training and development programmes
b) their perception about the role that they play in

training and development activities, and

c) the level of satisfaction that the end-users derive from training and development programmes organised by the organisation time to time.

d) Most preferred mode of learning.

These are some factors that may directly affect the success of developing trainers from the end-users. It also will help in identifying the most potential group of end-users who may act as trainers.

3.3 OPERATIONAL DEFINITIONS

For this study the following terms used are defined as follows.

1) Training - those activities that are designed to improve knowledge, skills and attitude and, thus equip the individual to be more effective in their present job or prepare him for a future assignment.[19] Or in other words teaching users to use software to do a particular job

2) Development - a long term educational process

utilising a systematic and organised procedure by which managerial personnel learn conceptual and theoretical knowledge for general purpose.[20] Or in other words teaching users to use computers so that they can apply the technology to the area in which they have expertise.

3) Management Information System - is used throughout this dissertation to include the following, usually more specific terms: Information System (IS), Computer - Based Information System (CBIS), Computer Information System (CIS), Electronic Data Processing (EDP) System, Decision Support System (DSS), Executive Support System (ESS), Information Reporting System (IRS), Transaction Processing System (TPS) and other information systems used by employees in organisations.

4) End-user - connotes anyone who uses a system for a specific purpose.[21] End-users include executives, managers, professional staff, secretaries, office workers, and others.

5) End-user Type - is based on classification scheme

developed by Rockart and Flannery.[22] In which end-users are classified on the basis of computer skill, method of computer use, application focus, education and training requirements, and in needed support. The three types are:

a) **Menu driven end-users** (Type 1)- imply those types of end-users who use someone else's software through a pre-established procedures or menus. They do not generate programs nor use report generators and fall in the category of non-skilled end-users

b) **Command level end-users** (Type 2) - imply those types of end-users who are able to generate simple inquiries, perform calculations and create simple reports and documents. They can manipulate information by using report generators and fall in the category of semi-skilled end-users

c) **Programming end-users** (Type 3) - imply those types of end-users using both command and procedural languages. They develop their own applications to be used by themselves or by others and fall in the category of skilled end-users.

6) End-user Computing - direct, hands-on use of computers by end-users not indirect use through

systems professionals on data processing staff.[23]

7) Attitude and Involvement - In this dissertation attitude refers to a mental state of users, i.e., their attitude or outlook toward training and development and the extent of their involvement in training and development activities. Involvement on the other hand refers to the observable or noticeable behaviour of users in training and development activities.

3.4 RESEARCH QUESTIONS

The above scenario lead to the following questions meriting research:

1. What is the extent of involvement of end-users in T&D activities in terms of
    a) initiating the programmes;
    b) evaluating programmes feasibility;
    c) justifying programmes expenditure;
    d) identifying training needs;
    e) setting programmes objectives;
    f) identifying potential problems;
    g) determining the content of training;

h) scheduling the training session;

i) training and instructing others;

j) preparing reading material;

k) working as a support person;

l) evaluating training effectiveness.

2. What is the perceived usefulness of the role that end-users play T&D activities?

3. What is the level of satisfaction with the quality of T&D programmes organised by the organisation from time to time?

4. Which mode of learning do end-user prefer?:

* Formal classes;
* Computer tutors;
* Reference manuals/textbooks/workbooks;
* Peers;
* Experimentation/trial and error.

5. What are the factors that effect the extent of involvement?

6. What is the most preferred type of relationship

between trainer and learner?

3.5 RESEARCH HYPOTHESES

Hypothesis 1: There is no significant difference in the extent of involvement among three types of end-users in T&D activities.

Hypothesis 2: There is no significant difference in the extent of involvement in T & D activities among end-users in different functional area.

Hypothesis 3: There is no significant relationship between the extent of involvement in T&D activities and number of computer related training programme attended, for each of the three types of end-users.

Hypothesis 4: There is no significant relationship between the extent of involvement in T & D activities and number of hours spent on computer per week, for each of the three types of end-users.

Hypothesis 5: There is no significant relationship between the extent of involvement in T & D activities and number of

hours spent on self learning of computer skill, for each of the three types of end-users.

Hypothesis 6: There is no significant relationship between the extent of involvement in T & D activities and perceived usefulness with involvement in T & D activities, for each of the three types of end-users.

Hypothesis 7: There is no significant relationship between the extent of involvement in T & D activities and the satisfaction with T & D programmes attended, for each of the three types of end-users.

Hypothesis 8: There is no significant relationship between the extent of involvement in T & D activities and number of years of computer experience, for each of the three types of end-users.

Hypothesis 9: There is no significant relationship between level of satisfaction with training programmes and number of years of computer experience, for each of the three types of end-users.

3.6 RESEARCH DESIGN

In this study survey research was used, as it has high potential to solve theoretical and applied educational problems.[24] Descriptive cross sectional study was adopted - a good method to identify characteristics of a particular group, measure their attitude and describe their behavioral pattern.[25]

3.7 POPULATION AND SAMPLE

To find extent of end-users involvement in T&D activities, satisfaction from T&D programmes and perception about the role that the end-user play in T&D activities, both service and non - service companies were contacted personally. The letter was handed over to them explaining the purpose and contribution of the study. A request was made to the organisation to furnish the researcher with the names of their employees using computers.

Sixty organisations in and around Delhi were contacted. Other companies in different regions in India were not surveyed because of access limitations. It is reasonable to conclude, however, that since population consisted of

managers, executives, professional staff, secretaries, office workers, and others that perform the same function as end-users the results represented end-users in general.

Of the sixty organisations contacted fifty one responded positively. In all, these organisations provided names of three hundred and seventy three personnel to the researcher. Out of the three hundred and seventy three names suggested, three hundred and fifty nine of them were contacted. Request was made to them to participate in the research by initially furnishing the following information:

a) The type of computer they use
b) Number of hours they spend on computers per week to solve their problems,
c) Number of computer training programs they attended in the last two years.
d) and finally, the category of end-user in which they fall.

Out of three hundred and fifty nine, two hundred and seventy agreed to participate. Ninety nine were from menu driven end-user's (Type 1), followed by eighty nine from command level (Type 2) and eighty two from programme level (Type3) end-users.

Finally, eighty respondents were selected from each of the above category, for primary data collection, on the basis of computer usage and number of training programme attended. Since primary variables of interest to this dissertation concerned the behaviour and attitudes of individual information system users, this research was conducted at individual level of analysis.

Based on the research of Rockart and Flannery, the population of end-users were classified into three types. The different types of end-users were not mutually exclusive. If any end-user, performed more than one type he was put in the higher category of end-users indicating his level of skill. The sample size of eighty was found sufficiently big as most of the researches, in education, are done using small nonrandom samples.[26]

To avoid high cost and difficulty in execution, quota sampling was preferred over random samples.[27] In quota (or quota control) sample, representativeness is achieved by assigning quotas to interviewers.

3.8 DATA COLLECTION METHOD

3.8.1 Questionnaire: design and modification

Self administered questionnaire was used which rely on efficiency of written words rather than on interviewer.[28] The questions used in the questionnaire were developed on the bases of reviewing previous literature, to find questions that were used previously. Suggestions were received from my associates and colleagues regarding difficulties with questions wording, problems with leading questions and bias due to order.

Once the initial questionnaire was developed, it was pre - tested to iron out fundamental problems in the instructions or questionnaire design. Verbal and written comments were received and changes incorporated.

To measure reliability of the questionnaire test-retest approach was adopted. " This is a common approach in such areas as educational testing."[29] In this approach we apply the same measure to the same subjects at two different points in time and compare the two measures to see they match each other. The correlation was found to be 0.761 falling in the

acceptable range.

3.8.2 Administering research questionnaire

Over a period of a few months, the end-users were contacted and interviews held. To increase response rate it was ensured that

a) Covering letter accompanied the questionnaire

b) Interesting questions were added

c) Follow - up was done

d) Anonymity of respondents was maintained

3.9 ANALYSIS AND INTERPRETATION OF DATA

3.9.1 Analysis of data

The data analysis was conducted in two separate phases. Demographic variables were analysed in the first phase of the study. The demographic data evaluated were: 1) Age; 2) Sex; 3) Education level; 4) Formal degree; 5) Functional area; 6) Position in the company; 7) No. of hours spent on the computer per week; 7) End-user type; 8) No. of training programmes attended; 9) Type of computer used; and 10) Number of years of computer experience.

In phase two, these variables, were analysed in relationship to the extent of involvement of end-users in T&D activities, the level of satisfaction with the extent of involvement in T&D activities and the perception of end-users regarding the quality of T&D programmes organised by the organisation.

Analysis of each hypothesis, in phase two was done as follows:

Analysis of variance (ANOVA) was used for testing Hypothesis 1 and Hypothesis 2. ANOVA was preferred over t-test because ANOVA does not compound the probability of committing a Type 1 error.[30] Later, Tukey's method of multiple comparisons and Scheffe's method of multiple comparisons were used respectively for finding out which of the population means were not equal.

Spearman rho was used for testing the hypothesis 3 to 9. The subjects were ranked in order of their score. Each subject was assigned a rank from 1 to 80. The highest score was ranked as one while duplicate ranking was averaged. This resulted in the correlation between -1.00 and +1.00. Spearman rho was preferred over Pearson correlation

coefficient because Pearson correlation coefficient is based on strong assumptions such as linearity and normality being particularly significant.[31]

All data were entered in a Spreadsheet program, Microsoft Excel (version 4). Statistical Analyses and Cross Tabulation were done through Microsoft Excel. Tool box of Microsoft Excel was also used, for generating descriptive statistics, performing F-Test and plotting graphs. Models were developed on Microsoft Excel to use Tukey's and Scheffe's method of multiple comparisons and Spearman rho correlation.

3.9.2 Statistical procedures for interpreting data

The following is a capsule summary of the statistical procedures used for interpreting the result.

Analysis of Variance (ANOVA): "Analysis of variance is a statistical procedure which, as its name implies, is used to examine population variance to determine whether the population means are equal."[32] It examines the variability in the samples that in turn helps in determining whether the population means are unequal or not.

In the population there are two estimates of the variability: mean square within (MSW) and mean square between (MSB). The mean square within is based on how many observations within each groups vary. The mean square between is based on how much the group means vary among themselves. If the null hypothesis is true (that is, all means are equal), MSW and MSB are expected to be nearly equal.

The Statistical test for the null hypothesis that all the groups have the same mean in the population is based on computing a F-statistics. Obtained by dividing MSB by MSW as shown in the following formula:

F = (Mean Square Between)/(Mean Square Within)

Tukey's Method of multiple comparisons. Tukey's method of multiple comparison finds out which population means are not equal once the analysis of variance leads to the rejection of the null hypothesis of equal population means.

Method involves establishing a T range, which is defined as

$$\text{T range} = T\sqrt{(MSW)}$$

where:

$$T=\frac{1}{\sqrt{n}}q$$

q = value from the studentized range table given α and D_1= k and D_1 = N-k degree of freedom.

n = common sample size

If the absolute difference of any pair of sample mean, $|X_i-X_j|$ is greater than T range we conclude that the population means are not equal.

This method does not compound the α level, but only applies when the sample sizes are equal[33]

Scheffe's method of multiple comparisons Like Tukey's method, Scheffe's method also determines which means are different once the analysis of variance leads to rejection of the null hypothesis of equal means. But unlike Tukey's method this method allows comparisons when the sample sizes are unequal.

This method involves establishing of S range, which is defined as

$$S\ Range = S\ \sigma$$

where; $S = \sqrt{(k-1)(F_{\alpha},\ D_1 = k-1,\ D_2 = N-K)}$

$\sigma = \sqrt{(1/n_i + 1/n_j)(MSW)}$

If the absolute difference of any pair of sample mean, $|X_i - X_j|$ is greater than S range we conclude that the population means are not equal.

Spearman Rank Correlation Coefficient Spearman rho correlation, denoted by r, is a measure of closeness of relationship between two variables when their distribution is not known.[34] Spearman's rank correlation coefficient computes the correlation between two sets of rankings using the following formula,

$$r = 1 - (6\ \Sigma\ d^2)/n(n^2-1)$$

where; d = number of places that an object differ in two rankings

n = number of objects ranked.

The result is a correlation between -1.00 and +1.00

3.10 LIMITATIONS OF STUDY

1. This study was restricted to computer end-users in medium and small size organizations. Thus, generalisation to big industrial houses may not be appropriate.

2. Approximately sixty organisations situated in and around Delhi were contacted. Other companies in different regions in India were not surveyed because of time and access limitations. It is reasonable to conclude, however, that since population consisted of managers, executives, professional staff, secretaries, office workers, and others that perform the same function as end-users. The results represented end-users in general. But still generalisations to other geographic locations may not be possible.

3. This study was limited to computer end-users who were using primarily micro computers. Therefore generalisations to end-users using other types of computers may not be correct.

4. The technique of self reporting was used for collecting information, generally considered the weakest.[35] Therefore, external check was incorporated to reduce inaccuracy and bias. The final eighty respondents were selected from each of the above category, based on the number of training programs attended and the total time that they spend on computers.

REFERENCES

1. de Nevfville, R., "System Analysis - a decision process", IMR, Spring, 1970, pp. 48-58.

2. Subramanyam, L., "Management through technology", PC Quest , October, 1992, pp. 18-21.

3. Parker, Charles S., Management Information Systems: Strategy and Action, Singapore, Mc-Graw Hill Book Co., 1989.

4. Argyris, C., Organisation and Innovation, Illinois, Richard D. Irwin, Inc., and the Dorsey Press, 1965.

5. Nelson, R.R. and Cheney, P.H., "Educating the CBIS User: A case analysis", Database, 18(2), 1987, pp. 11-16.

6. Rockart, J.F., "The line takes the leadership - IS management in a wired society", Sloan Management Review, 29(4), 1988, pp. 57-64.

7. Mohan, L. and Belardo, S., "A Contingency Approach to Managing Information Technology in Developing Nations: Benefiting from lessons learned in Developed Nations", in Bhatnagar, S.C. and Bjorn-Anderson, N. (eds.), Information Technology in Developing Countries, North Holland, 1990.

8. Raho, L.E., Belohlav, J.A. and Fiedler, K.D., "Assimilating new technology into the organisation: An assessment of McFarlan and McKenney's model", MIS Quarterly, 11(1), 1987, pp. 47-57.

9. Lees, J.D., "Successful development of small business information systems", Journal of Systems Management. 38(8), 1987, pp. 32-39.

10. Major, M., "DSS embraces new environments", Software News, 5(9), 1985, pp. 41-50.

11. Subramanyam, L., "The trainers and the trained", P C Quest, December, 1992, pp. 120.

12. Subramanyam, L., "Industry Focus: Computer Training", PC Quest, November, 1992, pp. 47-50.

13. Pawar, Rajendra S.,"IT Manpower in India: The Burning Issue", in Bhatnagar, S.C.(ed.) Information Technology Manpower, New Delhi, Tata McGraw-Hill Publishing Company Limited, 1992.

14. Tough, Allen., "Major Learning Efforts: Recent Research and Future Directions", Adult Education, 28, 1978, pp. 250-263.

15. Sharma, Suhil K., "Changing Dimensions of MIS: An end user computing", Indian Management, 32(2&3), 1993, pp. 7-13.

16. Parker, Charles S., Op. cit.

17. ibid.

18. Gerrity, T P., and Rockart, J F., "Are you a leader or a laggard", Sloan Management Review, 28(4), 1986, pp. 25 -34.

19. Saiyadain, Mirza S., Human Resources Management, New Delhi, Tata Mc Graw-Hill Publishing Company Limited, 1988.

20. Steinmetz, Lawrence L., "Age: Unrecognised Enigma of Executive Development", Management of Personnel Quarterly, 8(3), 1969.

21. Sharma, Sushil K., Op. cit.

22. Rockart, J.F.,& Flannery, L.S., "The Management of End user Computing", Communications of the ACM, 26, 1983, pp. 776-784.

23. Information Systems Management in Practice, ed. Ralph H. Sprague, Jr. and McNurlin, Barbara C. USA, Prentice - Hall International, Inc., 1986.

24. Kerlinger, Fred N., Foundations of Behavioral Research,New Delhi, Surjeet Publications, 1983.

25. Zikmund, Willaim G., Business Research Methods, Florida, The Dryden Press, 1988.

26. Kerlinger, Fred N., Op. cit.

27. ibid.

28. Zikmund, Willaim G., Op. cit.

29. Lehmann, Donald R., Marketing Research and Analysis, 3rd ed., IRWIN, Boston, 1989.

30. Groebner, David F & Shannon, Patrick W., Business Statistics: A Decision Making Approach, Ohio, Charles E. Merrill Publishing Co., 1981.

31. Brown, F.E., Marketing Research: A Structure for Decision Making, California, Addison-Wesley Publishing Company, 1980.

32. Groebner, David F & Shannon, Patrick W., Op. cit.

33. ibid.

34. Kothari, C.R., Research Methodology: Methods and Techniques, New Delhi, Wiley Eastern Limited, 1988.

35. Nunnally, Jum C., Test and Measurements: Assessment and Prediction, New York, McGraw-Hill, 1959.

CHAPTER FOUR

ANALYSIS AND INTERPRETATION

CHAPTER - 4

ANALYSIS AND INTERPRETATION

This chapter presents an analysis of the research data. The findings are presented in eight sections. The first section deals with the general demographic characteristics of the sample. Second section concentrates on the extent of involvement of end-users in training and development activities. The level of satisfaction of end-users with training and development programmes is examined in the third section. The usefulness of involvement in T&D activities as perceived by end-users has been dealt with in the fourth section. The fifth section reviews how the end-users spend their time on computers. The sixth section examines the most preferred mode of learning by the end-users. The seventh section deals with preferred relationship between trainers and learners and the final section reviews the findings of the nine hypotheses.

4.1 RESPONDENTS BACKGROUND RESULTS

Data on which the sample population was characterised (i.e., age, sex, functional area, position, education,

company type etc.) was not available before the administration of the questionnaire. All background information was based on self response.
Table 4.1 on page 110 gives a general overview of demographics by end-user type and by sample.

4.1.1 Age and Sex

The average age of the respondents was 37.85 years. Average age of 38.5 years for the Type 3 end-users was the highest followed by Type 2 and Type 1 end-users with an average age of 38.23 years and 36.81 years respectively. The Respondents varied in age from 20 years being the minimum and 57 years being the maximum. Table 4.2 on page 111 reviews in detail age demographics.

Females made up only 9.17 percent of the total sample and males 90.83 percent. Shown in the Table 4.3 on page 111.

4.1.2 Education

Table 4.4 on page 112 shows the highest degree obtained by the respondents. In the total sample, 85.42 percent of the end-users had master or bachelor degree with them. The

main degree for Type 1 and Type 2 end-user was bachelor degree, reporting 47.5 percent and 46.25 percent respectively. Dominant degree for Type 3 end-users was masters' reporting 55.0 percent. Most of the respondents were from Science and Social Science, making up 20.00 percent and 18.75 percent respectively of the total sample. Subjects with management degree were only 10 percent. For details see Table 4.5 on page 113.

4.1.3 Functional Area and Position

Table 4.6 on page 114 shows the functional areas of the end-users in the sample. The highest came from Finance area constituting 37.92 percent of the sample. Majority of the end-users were managers working at different levels in the organisation. For details see Table 4.7 on page 115. In Type 2 and Type 3 category most of the end-users were from Finance area followed by Production, indicating that end-users with higher skills are found in technical areas. This is also evident from Table 4.7, indicating that Type 3 were the most dominant among the professional staff.

4.1.4 Type of Company

Table 4.8 on page 115 shows the type of company the end user come from. 45.42 percent came from non-service company and the remaining 54.58 percent were from service companies.

4.1.5 Number of years of computer experience

Figure 4.9 on page 116 shows average number of years of computer experience both by end-users type and by functional area. Type 3 end-users, had the highest number of years experience followed by Type 2 and Type 1 with an average of 6.68 years, 5.35 years and 3.34 years respectively. Showing that computer experience increased as end-users moved from a Menu end-user to a Programming end-user. End-users in Finance area had the maximum number of years of computer experience followed by end-users in Production area. Type 3 end-users in the Finance area had the highest average number of years of experience of 7.34 years while Type 1 end-users in the Finance area had the lowest average number of years of experience of 3.10 years.

4.1.6 Training programmes attended

The detail breakup of training programmes attended is shown in Table 4.10 on page 116. All the 240 end-users had attended at least one training programme in the last two years prior to the interview. Average number of training programmes attended were four, four and six for Type 1 Type 2 and Type 3 end-users respectively. The mean number of hours spent on training programmes increased as one moved from Type 1 to Type 3 end-users. For the whole sample, the average number of training programmes attended was 4.67 and mean number of hours spent on training programmes was 74.33. Mostly training programme was conducted using external faculty or using both external and internal faculty implying that there is a dearth of trainers within the organisations.

4.2 EXTENT OF INVOLVEMENT IN T&D ACTIVITIES

Tables 4.11 to 4.24 recapitulates the questions asked to the end-users relating to the extent of involvement in T&D activities. A set of twelve questions was asked relating to their involvement in T&D activities. Table 4.11 on page 121 shows the spread of the result when respondents were asked

Table 4.1 : Overview of Demographic Characteristics of End-users

Demographic Data		Total Sample	Type of End Users		
			Type 1	Type 2	Type 3
Sample Size		240	80	80	80
Age in years(mean)		37.85	36.81	38.22	38.50
Sex	Male	218	68	72	78
	Female	22	12	8	2
Functional Area	Personnel	33	12	13	8
	Production	54	16	20	18
	Finance	91	20	33	38
	Marketing	62	32	14	16
Position	Managers	74	25	29	20
	Executives	50	10	22	18
	Professional Staffs	72	16	17	39
	Others	44	29	12	3
Highest Degree	High School	8	6	2	0
	Intermediate	22	10	7	5
	Bachelors	103	38	37	28
	Masters	102	26	32	44
	Doctorate	5	0	2	3
Average Computer experience (in years)		5.12	3.34	5.35	6.68
Average use of Computer (in hr's/week)		10.69	8.21	9.10	14.76
Training programmes attended in the last two years	Using internal faculty only	0.67	1	1	0
	Using external faculty only	2.67	2	2	4
	Invloving both	1.33	1	1	2
	Total	4.67	4	4	6
Company Type	Service	131	45	39	47
	Non-service	109	35	41	33

Table 4.2 : Age

USER TYPE	Average Age	Std. Deviation	Minimum	Maximum
Type1	36.81	9.14	21	56
Type 2	38.23	9.84	20	57
Type 3	38.50	9.66	20	57
Sample	37.85	9.55	20	57

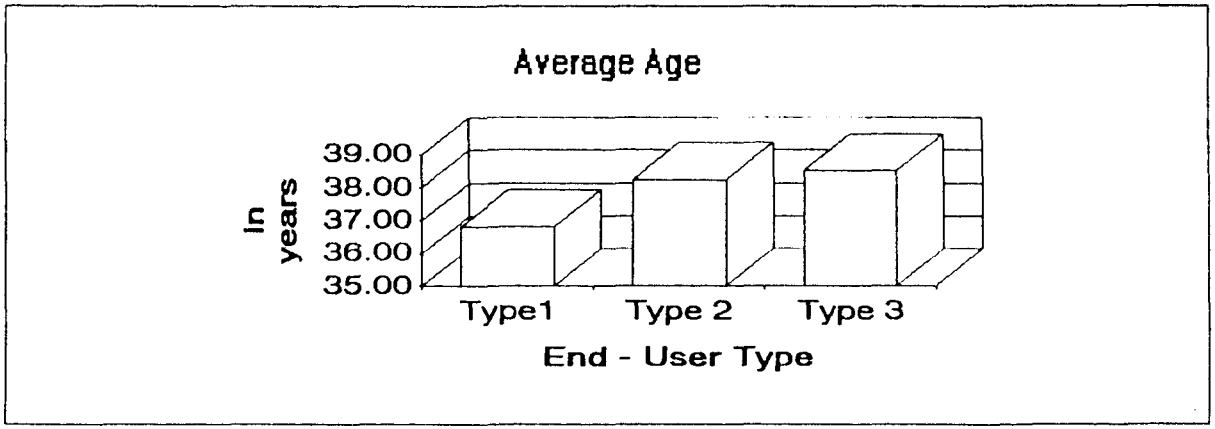


Table 4.3 : Sex Demographics

	USER TYPE			Grand Total	
SEX	Type 1	Type 2	Type 3	(count)	(%)
Female	12	8	2	22	9.17
Male	68	72	78	218	90.83
Grand Total	80	80	80	240	100

Table 4.4 : Highest Degree

HIGHEST DEGREE	USER TYPE			Grand Total	
	Type 1	Type 2	Type 3	(Count)	(%)
High School	6	2	0	8	3.33
Intermediate	10	7	5	22	9.17
Bachelor	38	37	28	103	42.92
Masters	26	32	44	102	42.50
Doctorate	0	2	3	5	2.08
Grand Total	80	80	80	240	100.00

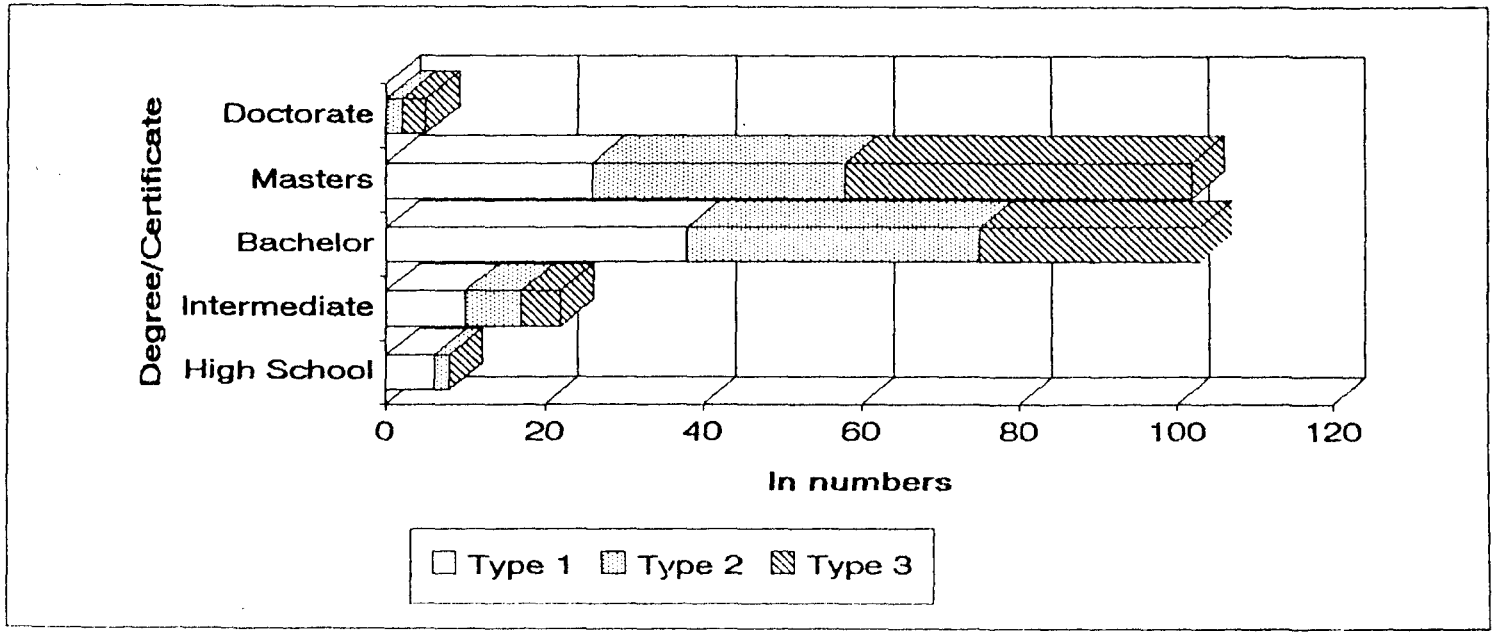


Table 4.5 : Formal Degree

FORMAL DEGREE	USER TYPE			Grand Total	
	Type 1	Type 2	Type 3	(Count)	(%)
Agriculture	2	0	0	2	0.83
Arts	6	12	10	28	11.67
C/A	4	4	0	8	3.33
Commerce	14	10	15	39	16.25
Engineering	12	11	14	37	15.42
Labour Welfare	2	0	0	2	0.83
Management	6	12	6	24	10.00
Medical	2	0	0	2	0.83
Science	14	14	20	48	20.00
Social Science	13	17	15	45	18.75
Others	5	0	0	5	2.08
Grand Total	80	80	80	240	100.00

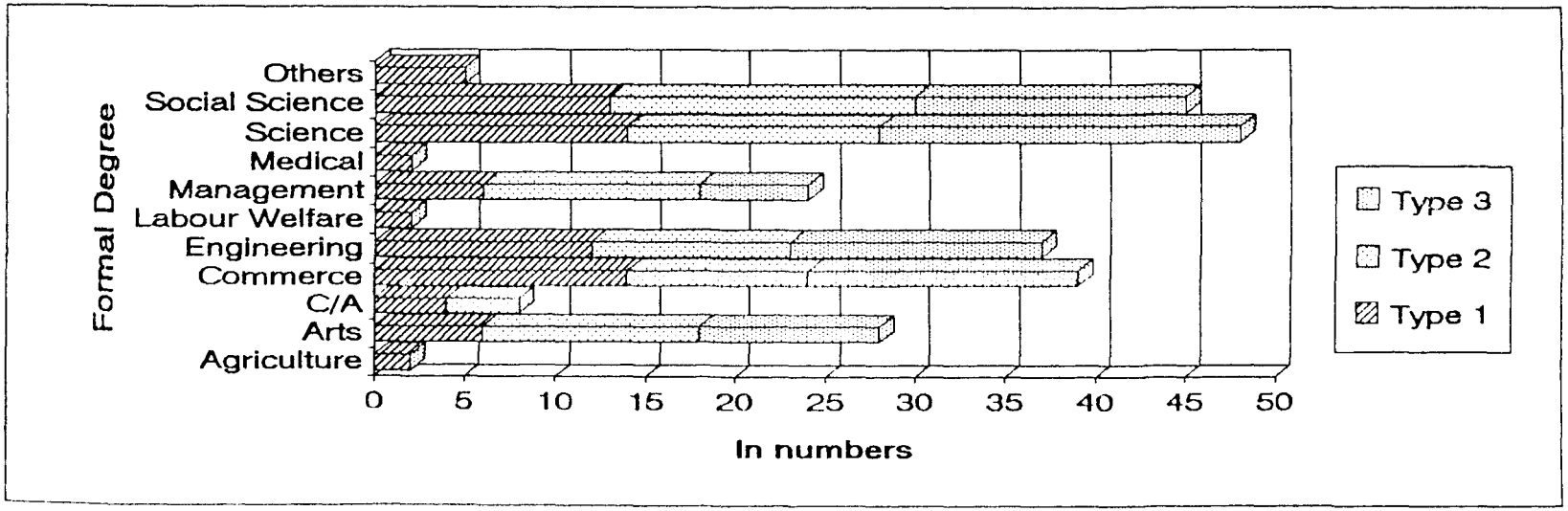


Table 4.6 : Functional Area

FUNCTIONAL AREA	USER TYPE			Grand Total	
	Type 1	Type 2	Type 3	(Count)	(%)
Finance	20	33	38	91	37.92
Marketing	32	14	16	62	25.83
Personnel	12	13	8	33	13.75
Production	16	20	18	54	22.50
Grand Total	80	80	80	240	100.00

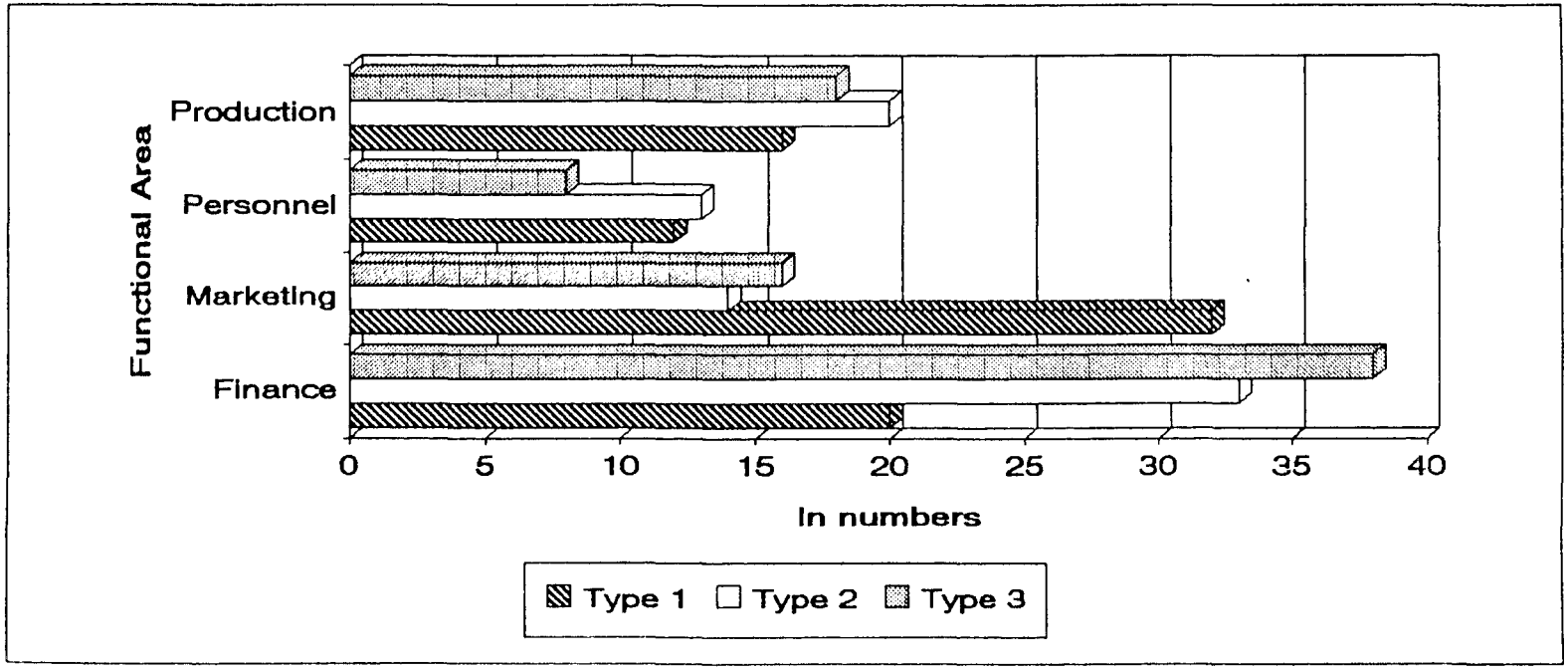


Table 4.7 : Position

POSITION	USER TYPE			Grand Total	
	Type 1	Type 2	Type 3	(Count)	(%)
Managers	25	29	20	74	30.83
Executives	10	22	18	50	20.83
Professional Staff	16	17	39	72	30.00
Others	29	12	3	44	18.33
Grand Total	80	80	80	240	100.00

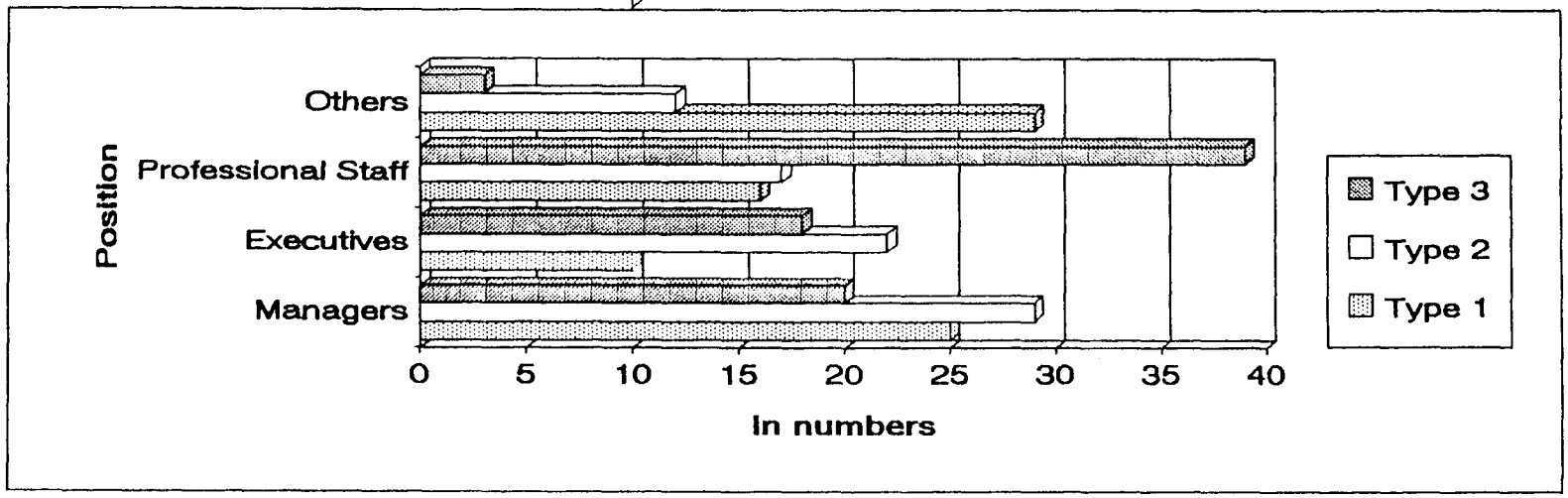


Table 4.8 : Company Type

COMPANY TYPE	USER TYPE			Grand Total	
	Type 1	Type 2	Type 3	(Count)	(%)
Non-Service	35	41	33	109	45.42
Service	45	39	47	131	54.58
Grand Total	80	80	80	240	100.00

Table 4.9 : Average number of years of computer experience

FUNCTIONAL AREA	USER TYPE			Average
	Type 1	Type 2	Type 3	
Finance	3.10	5.33	7.34	5.68
Marketing	3.47	5.00	6.44	4.58
Personnel	3.33	5.54	6.00	4.85
Production	3.38	5.50	5.78	4.96
Average	3.34	5.35	6.68	5.12

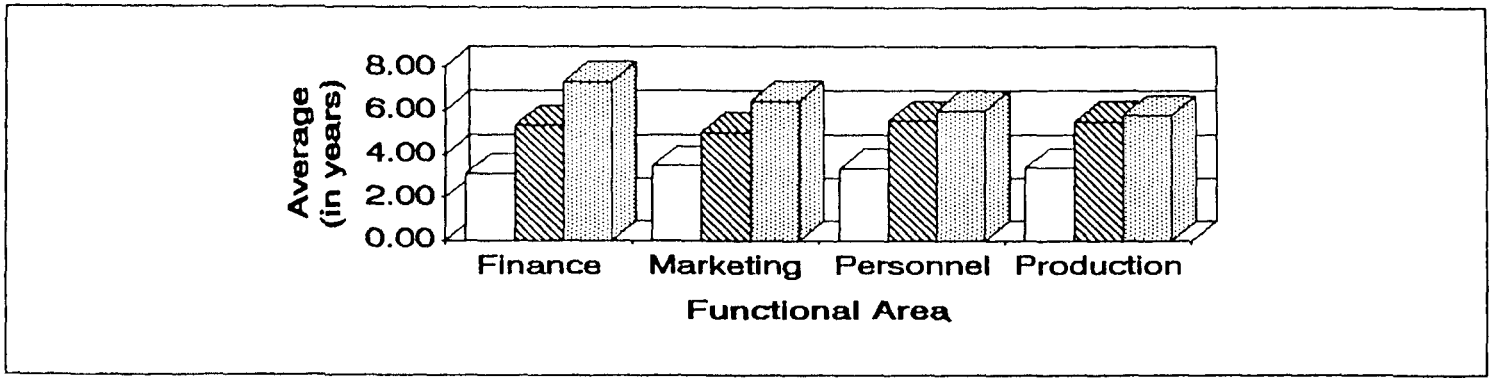


Table 4.10 : Training Programmes Attended

Training Programme		Sample	USER TYPE		
			Type 1	Type 2	Type 3
Using internal faculty only	Number	0.67	1	1	0
	Mean Hr's	22.67	18	20	30
Using external faculty only	Number	2.67	2	2	4
	Mean Hr's	40.00	30	30	60
Involving both internal and external faculty	Number	1.33	1	1	2
	Mean Hr's	11.67	10	10	15
Total	Number	4.67	4	4	6
	Mean Hr's	74.33	58.00	60.00	105.00

about how much they are involved in initiating computer training programmes. The average response of 2.68 shows that the end-users participated from little to moderate in initiating training programmes.

Table 4.12 on page 121 shows the average response of 2.01 when the respondents were asked how much they are involved in evaluating programmes feasibility. The finding shows that involvement in evaluating programme feasibility was little for Type 1 and Type 2. For Type 3 end-users their involvement varied from little to moderate.

Table 4.13 on page 122 shows that 87.5 percent of the Type 1 end-users and 85 percent of Type 2 end-users either do not participate at all or participate very little in justifying programme expenditure. In case of Type 3 end-users 50 percent participated from moderately to very much in justifying programme expenditure. The average response for the entire sample was just 1.60.

Table 4.14 on page 122 presents the spread of the response to the question relating to the identification of training needs. Approximately 60.00 percent of the end-users indicated that they participated in identifying training

needs from little to very much, with an average response of 3.12. Type 1 end-users were more active in identifying training needs compared to Type 2 and Type 3 end-users.

Table 4.15 on page 123 indicates the level of involvement of end-users in setting training programme objectives. The average response of 2.46 shows that end-users participated from little to moderately in setting programme objectives. Type 3 end-users were more active in setting training programme objectives compared to Type 1 and Type 2 end-users.

Table 4.16 on page 123 displays the result when the respondents were asked about how much they are involved in identifying potential problems in conducting training programmes. The average response of 2.33 displays that the end-users participated from little to moderately in identifying potential problems.

The average response of 3.43 in Table 4.17 on page 124 shows that end-users participated from moderately to much in determining the content of training. Type 3 end-users were more involved in this activity compared to Type 1 and Type 2 end-users, with an average response of 3.66.

The question related to training and instructing others gives an average response of 2.25 as shown in Table 4.18 on page 124. Only 35 percent of the end-users were involved from moderately to very much in training and instructing others. Their involvement in training and instructing others increased as they moved from Type 1 to Type 3 end-user.

Question relating to scheduling of training programme, gave an average response of 2.67 for details see Table 4.19 on page 125. For all categories of end-users their participation in scheduling training programme was approximately the same.

Table 4.20 on page 125 relating to working of end-user as support person, also gave a low average response of 1.50 where majority of the end-users hardly participating in this aspect. Type 3 end-users were more involved in this activity compared to Type 1 and Type 2 end-users.

Similarly, Table 4.21 on page 126 related to preparation of reading material shows a low average response of 1.26. Suggesting that end-users hardly participate in preparing reading material. 42.5 percent of Type 1 end-users and

53.75 percent of Type 2 end-users did not participate at all in preparing reading materials.

The last Table 4.22 on page 126 in this series deals with the question relating to the end-users involvement in evaluating training effectiveness in terms of overall effectiveness, content and method used, participant's attitude and behaviour, participation behaviour on the job, and trainer behaviour. An average response of 1.42 shows that their involvement in this activity is also very low. Hardly any follow up activity was done by end-users.

Table 4.23 on page 127 gives an overview, of the extent of involvement of end-users in different aspects of T&D activities, in terms of Difference Index and Ratio Index. From these indexes it is evident that end-users are involved mostly in identifying training needs and determining the content of the training. Further, they are least involved as support person, preparing reading materials and in evaluating training effectiveness. Thus, it may be concluded that out the three phases in training process, i.e. Phase 1: Pre-training, Phase 2: Training, and Phase 3: Post-training, the end-users are usually involved in pre-training phase. They hardly participate in the

Table 4.11 : Initiating Training Programme

Value Label	Value	USER TYPE			Frequency	Percentage	Cum. percentage
		Type 1	Type 2	Type3			
Not Applicable	0	2	6	3	11	4.58	4.58
Very Little	1	13	14	15	42	17.50	22.08
Little	2	24	22	15	61	25.42	47.50
Moderately	3	22	16	20	58	24.17	71.67
Much	4	10	10	14	34	14.17	85.83
Very Much	5	9	12	13	34	14.17	100.00
	Grand Total	80	80	80	240	100.00	

Average response (overall)	2.68
Average response (Type 1)	2.65
Average response (Type 2)	2.58
Average response (Type 3)	2.83

Table 4.12 : Evaluating Programmes Feasibility

Value Label	Value	USER TYPE			Frequency	Percentage	Cum. percentage
		Type 1	Type 2	Type3			
Not Applicable	0	16	15	9	40	16.67	16.67
Very Little	1	15	23	18	56	23.33	40.00
Little	2	30	18	12	60	25.00	65.00
Moderately	3	12	15	21	48	20.00	85.00
Much	4	5	2	11	18	7.50	92.50
Very Much	5	2	7	9	18	7.50	100.00
	Grand Total	80	80	80	240	100.00	

Average response (overall)	2.01
Average response (Type 1)	1.76
Average response (Type 2)	1.84
Average response (Type 3)	2.43

Table 4.13 : Justifying Programme Expenditure

Value Label	Value	USER TYPE			Frequency	Percentage	Cum. percentage
		Type 1	Type 2	Type3			
Not Applicable	0	24	28	7	59	24.58	24.58
Very Little	1	33	29	17	79	32.92	57.50
Little	2	13	11	16	40	16.67	74.17
Moderately	3	7	9	20	36	15.00	89.17
Much	4	2	0	10	12	5.00	94.17
Very Much	5	1	3	10	14	5.83	100.00
	Grand Total	80	80	80	240	100.00	
	Average response (overall)			1.60			
	Average response (Type 1)			1.16			
	Average response (Type 2)			1.16			
	Average response (Type 3)			2.49			

Table 4.14 : Identifying Training Needs

Value Label	Value	USER TYPE			Frequency	Percentage	Cum. percentage
		Type 1	Type 2	Type3			
Not Applicable	0	2	0	4	6	16.67	16.67
Very Little	1	9	8	12	29	23.33	40.00
Little	2	10	17	13	40	25.00	65.00
Moderately	3	23	21	18	62	20.00	85.00
Much	4	18	22	21	61	7.50	92.50
Very Much	5	18	12	12	42	7.50	100.00
	Grand Total	80	80	80	240	100.00	
	Average response (overall)			3.12			
	Average response (Type 1)			3.25			
	Average response (Type 2)			3.16			
	Average response (Type 3)			2.95			

Table 4.15 : Setting Programme Objectives

Value Label	Value	USER TYPE			Frequency	Percentage	Cum. percentage
		Type 1	Type 2	Type3			
Not Applicable	0	9	7	2	18	7.50	7.50
Very Little	1	16	18	9	43	17.92	25.42
Little	2	22	23	23	68	28.33	53.75
Moderately	3	21	15	19	55	22.92	76.67
Much	4	9	10	15	34	14.17	90.83
Very Much	5	3	7	12	22	9.17	100.00
	Grand Total	80	80	80	240	100.00	

Average response (overall)	2.46
Average response (Type 1)	2.18
Average response (Type 2)	2.30
Average response (Type 3)	2.90

Table 4.16 : Indentifying Potential Problems

Value Label	Value	USER TYPE			Frequency	Percentage	Cum. percentage
		Type 1	Type 2	Type3			
Not Applicable	0	7	12	7	26	16.67	16.67
Very Little	1	17	14	17	48	23.33	40.00
Little	2	27	16	18	61	25.00	65.00
Moderately	3	17	21	16	54	20.00	85.00
Much	4	10	7	11	28	7.50	92.50
Very Much	5	2	10	11	23	7.50	100.00
	Grand Total	80	80	80	240	100.00	

Average response (overall)	2.33
Average response (Type 1)	2.15
Average response (Type 2)	2.34
Average response (Type 3)	2.50

Table 4.17 : Determining the Content of Training

Value Label	Value	USER TYPE			Frequency	Percentage	Cum. percentage
		Type 1	Type 2	Type3			
Not Applicable	0	4	2	0	6	2.50	2.50
Very Little	1	10	9	6	25	10.42	12.92
Little	2	12	8	7	27	11.25	24.17
Moderately	3	15	14	20	49	20.42	44.58
Much	4	22	23	22	67	27.92	72.50
Very Much	5	17	24	25	66	27.50	100.00
	Grand Total	80	80	80	240	100.00	
	Average response (overall)			3.43			
	Average response (Type 1)			3.15			
	Average response (Type 2)			3.49			
	Average response (Type 3)			3.66			

Table 4.18 : Training and Instructing Others

Value Label	Value	USER TYPE			Frequency	Percentage	Cum. percentage
		Type 1	Type 2	Type3			
Not Applicable	0	11	10	5	26	16.67	16.67
Very Little	1	25	16	13	54	23.33	40.00
Little	2	19	22	18	59	25.00	65.00
Moderately	3	16	20	16	52	20.00	85.00
Much	4	8	7	17	32	7.50	92.50
Very Much	5	1	5	11	17	7.50	100.00
	Grand Total	80	80	80	240	100.00	
	Average response (overall)			2.25			
	Average response (Type 1)			1.85			
	Average response (Type 2)			2.16			
	Average response (Type 3)			2.75			

Table 4.19 : Scheduling Training Sessions

Value Label	Value	USER TYPE			Frequency	Percentage	Cum. percentage
		Type 1	Type 2	Type3			
Not Applicable	0	6	2	4	12	5.00	5.00
Very Little	1	13	20	13	46	19.17	24.17
Little	2	21	16	15	52	21.67	45.83
Moderately	3	19	25	19	63	26.25	72.08
Much	4	9	12	13	34	14.17	86.25
Very Much	5	12	5	16	33	13.75	100.00
	Grand Total	80	80	80	240	100.00	

Average response (overall)	2.67
Average response (Type 1)	2.60
Average response (Type 2)	2.50
Average response (Type 3)	2.90

Table 4.20 : Working As A Support Person

Value Label	Value	USER TYPE			Frequency	Percentage	Cum. percentage
		Type 1	Type 2	Type3			
Not Applicable	0	21	32	14	67	16.67	16.67
Very Little	1	28	23	20	71	23.33	40.00
Little	2	16	14	19	49	25.00	65.00
Moderately	3	12	8	12	32	20.00	85.00
Much	4	3	1	5	9	7.50	92.50
Very Much	5	0	2	10	12	7.50	100.00
	Grand Total	80	80	80	240	100.00	

Average response (overall)	1.50
Average response (Type 1)	1.35
Average response (Type 2)	1.11
Average response (Type 3)	2.05

Table 4.21 : Preparing Reading Material

Value Label	Value	USER TYPE			Frequency	Percentage	Cum. percentage
		Type 1	Type 2	Type3			
Not Applicable	0	34	43	18	95	39.58	39.58
Very Little	1	26	27	23	76	31.67	71.25
Little	2	13	5	9	27	11.25	82.50
Moderately	3	4	3	7	14	5.83	88.33
Much	4	2	0	7	9	3.75	92.08
Very Much	5	1	2	16	19	7.92	100.00
	Grand Total	80	80	80	240	100.00	

Average response (overall)	1.26
Average response (Type 1)	0.96
Average response (Type 2)	0.70
Average response (Type 3)	2.13

Table 4.22 : Evaluating Training Effectiveness

Value Label	Value	USER TYPE			Frequency	Percentage	Cum. percentage
		Type 1	Type 2	Type3			
Not Applicable	0	32	20	19	71	16.67	16.67
Very Little	1	26	30	25	81	23.33	40.00
Little	2	12	19	12	43	25.00	65.00
Moderately	3	6	9	8	23	20.00	85.00
Much	4	2	0	4	6	7.50	92.50
Very Much	5	2	2	12	16	7.50	100.00
	Grand Total	80	80	80	240	100.00	

Average response (overall)	1.42
Average response (Type 1)	1.08
Average response (Type 2)	1.31
Average response (Type 3)	1.86

Table 23 : Involvement Indexes

Nature of Involvement	Type 1	Type 2	Type 3	Average Score	Difference Index	Ratio Index
Initiating programme	2.65	2.58	2.83	2.68	0.45	1.20
Evaluating programme feasibility	1.76	1.84	2.43	2.01	-0.22	0.90
Justifying programme expenditure	1.16	1.16	2.49	1.60	-0.63	0.72
Identifying training needs	3.25	3.16	2.95	3.12	0.89	1.40
Setting training objectives	2.18	2.30	2.90	2.46	0.23	1.10
Identifying potential problems	2.15	2.34	2.50	2.33	0.10	1.04
Determining the content of training	3.15	3.49	3.66	3.43	1.20	1.54
Training and instructing others	1.85	2.16	2.75	2.25	0.02	1.01
Scheduling training session	2.60	2.50	2.90	2.67	0.44	1.20
Working as a support person	1.35	1.11	2.05	1.50	-0.73	0.67
Preparing reading material	0.96	0.70	2.13	1.26	-0.97	0.57
Evaluating training effectiveness	1.08	1.31	1.86	1.42	-0.81	0.64
Overall Average	2.01	2.05	2.62	2.23		

Table 24 : Relative Involvement

	User Type			
Nature of Involvement	Type 1	Type 2	Type 3	Sample
Initiating programme	3	3	5	3
Evaluating programme feasibility	8	8	9	8
Justifying programme expenditure	10	10	8	9
Identifying training needs	1	2	2	2
Setting training objectives	5	6	3	5
Identifying potential problems	6	5	7	6
Determining the content of training	2	1	1	1
Training and instructing others	7	7	6	7
Scheduling training session	4	4	3	4
Working as a support person	9	11	11	10
Preparing reading material	12	12	10	12
Evaluating training effectiveness	11	9	12	11

training and post-training phase of the training process. Table 4.24 on page 127 gives the relative involvement in T&D activities by end-user types and sample.

4.3 SATISFACTION FROM TRAINING PROGRAMMES

The Table 4.25 on page 134 gives an overview of satisfaction of end-users from training programmes conducted by organisations from time to time. The satisfaction from training programme is presented from seven different perspectives, i.e., entire sample, end-user type, sex, functional area, position, computer experience, formal degree and finally company type. Satisfaction level was classified into two, i.e., satisfied and unsatisfied. The subjects scoring an average response of less then 2.5 were classified as unsatisfied and those scoring 2.5 or more were classified as satisfied.

It is evident from the table that 65 percent of the end-users in the entire sample were not satisfied with the training programmes. From end-users point of view, Type 2 and Type 3 end-users were more unsatisfied compared to Type 1 end-users. Further, males were more satisfied than females with satisfaction level of 35.32 percent and 31.82

percent respectively. End-users in the Production area were most unsatisfied followed by end-users in Finance area.

It is also clear that as the computer experience increased the level of satisfaction with training programme reduced. 40 percent of end-users having up to 2 years of experience were satisfied by training programme but the percentage of satisfaction reduced substantially to 27.08 percent as the experience increased to more than 8 years. End-users working in service sector were more satisfied compared to end-users working in non-service sector.

Further, only 29.73 percent of the end-users with management degree were satisfied. This indicated that end-users in management position were least satisfied with training programmes followed by end-users among professional staffs. The implication of this is discusses in chapter five.

4.4 USEFULNESS OF INVOLVEMENT IN T&D ACTIVITIES

How useful was the involvement of end-users in T&D activities as perceived by the end-users is summed up in the Table 4.26 on page 135. Approximately seventy percent

of the end-users were of the view that their involvement in T&D activities was useful. Further, as the end-users experience with computer increased, they found it to be more useful to participate in T&D activities. Around 62.69 percent of the end-users having up to 2 years of experience found it useful to participate in T&D activities that steadily increased to 77.08 percent for the end-users with more than 8 years of experience.

Another view of usefulness with involvement in training programmes is from the angle of functional area. Forty-four subjects from a total of sixty-two in marketing area found it useful to participate in T&D activities, amounting to 70.97 percent of the end-users in this category. This was followed by the end-users in the production area in which 70.37 percent of the end-users found it useful to participate in T&D activities, for details see Table 4.26. Lastly, the end-users in non-service sector found it more useful to participate in T&D activities compared to end-users in the service organisations. With 71.56 percent and 67.94 percent of end-users in non-service and service companies respectively finding it useful to participate in T&D activities.

Among professional staffs 77.78 percent of the end-users found it useful to participate in T&D activities. Followed by 68.92 percent of end-users satisfied in management position.

4.5 COMPUTER USAGE AT WORK

4.5.1 Time spent on computer

The average hours spent on the computer per week at work exhibits a wide range across each of the three samples. The upper range for Type 1, Type 2 and Type 3 end-users was 14 hours, 21 hours and 29 hours respectively. The minimums for Type 1 and Type 2 were 1 hour each and for Type 3 it was 5 hours. The standard deviation was found to be 2.87, 4.84 and 5.67 for Type 1, Type 2 and Type 3 end-users respectively.

The mean number of hours of computer use per week for entire sample was 10.69 hours. Type 1 end-user used the computers the least with 8.21 hours per week, followed by Type 2 end-users with 9.10 hours, and Type 3 end-users had the highest mean of 14.76 hours per week as shown in Table 4.27 on page 136. The end-users in Finance area spent on

an average, 13.29 hours per week on computer while end-users in other functional areas spent on average, 8 to 9 hours per week. For details see Table 4.27.

4.5.2 Time spent on self learning

It is evident from Table 4.28 on page 136 that around 25 percent of the total time that end-users spend on computers is devoted for improving their skills. The percentage of time devoted on self learning as reported by Type 3 end-users was 31.89 percent and for Type 2 and Type 1 it was 16.41 and 25.45 percent respectively. The end-users in Personnel department spent the least amount of time for improving their skill. While end-users Finance, Marketing and Production area spent almost the same amount of time on self learning.

4.6 PREFERRED MODE OF LEARNING

When subjects were asked to indicate the most preferred mode of learning 30 percent of the end-users showed their preference for peers followed by reference manuals/textbooks/workbooks. Formal classes were preferred by just 12.083 percent of the end-users. End-user wise

preference shows that Type 1 and Type 2 gave preference to peers followed by reference manual/Textbooks/workbooks. Type 3 end-users gave preference to peers followed by Experimentation/trial and error. The implication of this is discussed in chapter five. For details see page 137.

4.7 PREFERRED RELATIONSHIP BETWEEN TRAINERS AND LEARNERS

When the end-users were asked to identify the most preferred relationship between trainer and learner in training programme, 46 percent indicated that they believe in "both the trainer and learner to work together to design and carrying out training programmes"; 30 percent stated that " the trainer or learner should dominate the design and carrying out of training programmes while other play only a minor role"; 20 percent saw "trainer should only design and implement training programmes"; and the remaining 4 percent saw trainer and top manager should design and implement training programmes.

4.8 RESULTS OF HYPOTHESES

Each of the hypotheses, developed in Chapter Three, has been tested and the results are discussed in this section.

Table 4.25 : Overview of Satisfaction with Training Programme

		Total Sample	Level of satisfaction		
			Satisfied	Unsatisfied	% Satisfied
Sample		240	84	156	35.00
End-user by					
Type	Type 1	80	30	50	37.50
	Type 2	80	27	53	33.75
	Type 3	80	27	53	33.75
Sex	Male	218	77	141	35.32
	Females	22	7	15	31.82
Functional Area	Personnel	33	12	21	36.36
	Production	54	14	40	25.93
	Finance	91	30	61	32.97
	Marketing	62	28	34	45.16
Position	Managers	74	22	52	29.73
	Executives	50	18	32	36.00
	Professional Staffs	72	24	48	33.33
	Others	44	16	28	36.36
Computer Experience (in years)	0-2	15	6	9	40.00
	2-4	67	28	39	41.79
	4-6	60	23	37	38.33
	6-8	50	14	36	28.00
	8 or more	48	13	35	27.08
Formal Degree	Agriculture	2	1	1	50.00
	Arts	28	12	16	42.86
	C/A	8	3	5	37.50
	Commerce	44	14	30	31.82
	Engineering	37	13	24	35.14
	Lab. Welfare	2	0	2	0.00
	Management	24	7	17	29.17
	Medical	2	0	2	0.00
	Others	5	2	3	40.00
	Science	56	20	36	35.71
	Social Sc.	32	12	20	37.50
Company Type	Service	131	47	84	35.88
	Non-service	109	37	72	33.94

Table 4.26 : Perceived usefulness of involvement in T&D activities

		Total	Level of usefulness		
			Useful	Not useful	% (Useful)
Sample		240	167	73	69.58
End-user by					
Type	Type 1	80	50	30	62.50
	Type 2	80	56	24	70.00
	Type 3	80	61	19	76.25
Sex	Male	218	154	64	70.64
	Females	22	13	9	59.09
Functional Area	Personnel	33	23	10	69.70
	Production	54	38	16	70.37
	Finance	91	62	29	68.13
	Marketing	62	44	18	70.97
Position	Managers	74	51	23	68.92
	Executives	50	30	20	60.00
	Professional Staffs	72	56	16	77.78
	Others	44	30	14	68.18
Computer Experience (in years)	0-2	15	9	6	60.00
	2-4	67	43	24	64.18
	4-6	60	39	21	65.00
	6-8	50	39	11	78.00
	8 or more	48	37	11	77.08
Formal Degree	Agriculture	2	0	2	0.00
	Arts	28	19	9	67.86
	C/A	8	4	4	50.00
	Commerce	44	32	12	72.73
	Engineering	37	27	10	72.97
	Lab. Welfare	2	2	0	100.00
	Management	24	19	5	79.17
	Medical	2	1	1	50.00
	Others	5	5	0	100.00
	Science	56	39	17	69.64
	Social Sc.	32	19	13	59.38
Company Type	Service	131	89	42	67.94
	Non-service	109	78	31	71.56

Table 4.27: Average number of hours per week spent on computer

FUNCTIONAL. AREA	USER TYPE			Sample
	Type 1	Type 2	Type 3	
Finance	10.00	9.84	17.70	13.29
Marketing	8.56	5.79	14.25	9.40
Personnel	6.25	11.67	11.00	9.59
Production	6.75	7.63	10.14	8.39
Mean	8.21	9.10	14.76	10.69
Minimum	1.00	1.00	5.00	1.00
Maximum	14.00	21.00	29.00	29.00
Standard Deviation	2.87	4.84	5.67	4.46

Table 4.28 : Percentage of the total time spent on computer devoted for improving skill

FUNCTIONAL. AREA	USER TYPE			Mean
	Type 1	Type 2	Type 3	
Finance	25.20	22.06	28.03	25.24
Marketing	28.75	12.00	39.56	27.76
Personnel	17.83	11.77	28.63	18.06
Production	24.88	13.20	34.67	23.81
Mean	25.45	16.41	31.89	24.58

Table 4.29 : Preferred Mode of Learning

Mode	USER TYPE			Grand Total	
	Type 1	Type 2	Type3	(Count)	(%)
Peers	22	21	29	72	30.00
Reference manual/textbooks/workbooks	21	22	16	59	24.58
Experimentation/trial and error	10	13	19	42	17.50
Computer Tutors	16	15	7	38	15.83
Formal Classes	11	9	9	29	12.08
Grand Total	80	80	80	240	

Hypothesis 1: There is no significant difference in the extent of involvement among three types of end-users in T&D activities.

The objective of this hypothesis was to test the difference in the extent of involvement among the Menu end-users (Type 1), Command end-users (Type 2) and Programming end-users (Type 3). Analysis of variance was used for finding the difference and results are summarised in Table 4.30 on page 150. Since F ratio was found greater than F critical at .05 level of significance the null hypothesis of equal means was rejected, indicating a significant difference in the extent of involvement in T&D activities among the three types of end-users.

As analysis of variance lead to the rejection of null hypothesis of equal means, Tukey's Method of Multiple Comparisons was used for finding out which of the end-users were not equal in their extent of involvement in T&D activities. The summarised results of Tukey's Method of Multiple Comparisons are shown in Table 4.30. Based on Tukey's Method of Multiple Comparisons it may be concluded that mean response for Type 1 end-users is not equal to the mean response for Type 3 end-users and that the mean

response for Type 2 end-users is not equal to the mean response for Type 3 end-users. However, there is not enough statistical evidence to conclude that the mean responses of Type 1 end-users and Type 2 end-users are different. To restate, the findings of this study indicate that Type 3 end-users are more involved in T&D activities compared to Type 1 and Type 2 end-users. While the extent of involvement between Type 1 and Type 2 end-users does not indicate a significant difference.

Hypothesis 2: There is no significant difference in the extent of involvement in T&D activities among end-users in different functional area.

The objective of this hypothesis was to test the difference in the extent of involvement among the Menu end-users (Type 1), Command end-users (Type 2) and Programming end-users (Type 3) working in different functional areas. Analysis of variance was used for finding the difference and results are summarised in Table 4.31 on page 151. Since F ratio was found greater than F critical at .05 level of significance the null hypothesis of equal means was rejected, indicating a significant difference in the extent of involvement in

T&D activities among end-users in different functional area.

Since analysis of variance lead to the rejection of the null hypothesis of equal means, Scheffe's Method of Multiple Comparisons was used for determining which of the end-users were not equal in their extent of involvement in T&D activities. The summarised results of Scheffe's Method of Multiple Comparisons are shown in Table 4.31. On the basis of Scheffe's Method of Multiple Comparisons it can be concluded that end-users in Marketing and Production areas are less involved in T&D activities than end-users in Personal area. Whereas, there is not enough statistical evidence to conclude that the extent of involvement in T&D activities is significantly different between end-users in Personnel area and Finance area.

Hypothesis 3: There is no significant relationship between the extent of involvement in T&D activities and number of computer related training programmes attended, for each of the three types of end-users.

To test this hypothesis Spearman rho correlation coefficient was used by ranking total number of training

programmes attended and scores of extent of involvement for each of the three types of end-users. The results are summarised on Table 4.32 on page 152. First Spearman rho test evaluated Type 1 or Menu end-users and found a correlation coefficient of 0.081. The null hypothesis was accepted at .05 percent level of significance and common factor variance was 0.66 percent. Common factor variance indicates the percentage of variance in one variable associated with or determined by the variance in another variable. Then, Spearman rho test evaluated Type 2 or Command end-users and found a correlation coefficient of 0.086. The null hypothesis was accepted at .05 percent level of significance and common factor variance was 0.73 percent. Lastly, Spearman rho test evaluated Type 3 or Programming end-users and found a correlation coefficient of 0.030. The null hypothesis was accepted at .05 percent level of significance and common factor variance was 0.09 percent. Therefore, according to the findings of this study, there is no significant relationship between extent of involvement and number of training programmes attended for each of the three types of end-users.

Hypothesis 4: There is no significant relationship between the extent of involvement in T&D activities and number of

hours spent on computer per week, for each of the three types of end-users.

To test this hypothesis Spearman rho correlation coefficient was used. The number of hours spent on computer per week and scores of extent of involvement for each of the three types of end-users were ranked. The results are summarised on Table 4.33 on page 152. First Spearman rho test evaluated Type 1 or Menu end-users and found a correlation coefficient of 0.508 that established a significant positive relationship at .05 level of significance. The null hypothesis was rejected and common factor variance was found to be 25.82 percent. Then, Spearman rho test evaluated Type 2 or Command end-users and found a correlation coefficient of 0.039. The null hypothesis was accepted at .05 percent level of significance and common factor variance was found to be 0.15 percent. Lastly, Spearman rho test evaluated Type 3 or Programming end-users and found a correlation coefficient of 0.002 rejecting the null hypothesis at .05 percent level of significance. Common factor variance was zero. Therefore, according to the findings of this study, a significant positive relationship exists between extent of involvement and number of hours spent on computer for

Type 1 end-users. For Type 2 and Type 3 end-users relationship was not found to be significant.

Hypothesis 5: There is no significant relationship between the extent of involvement in T&D activities and number of hours spent on self learning of computer skills, for each of the three types of end-users.

To test this hypothesis Spearman rho correlation coefficient was used. The percentage of hours spent on computer devoted to self learning and scores of extent of involvement for each of the three types of end-users were ranked. The results are summarised on Table 4.34 on page 153. First Spearman rho test evaluated Type 1 or Menu end-users and found a correlation coefficient of 0.917 that established a significant relationship at .05 level of significance. The null hypothesis was rejected and common factor variance was found to be 84.15 percent. Then, Spearman rho test evaluated Type 2 or Command end-users and found a correlation coefficient of 0.807 establishing a significant relationship at .05 level of significance. The null hypothesis was rejected and common factor variance was found to be 65.07 percent. Lastly, Spearman rho test evaluated Type 3 or Programming end-users and

found a correlation coefficient of 0.474 establishing a significant relationship at .05 level of significance. The null hypothesis was rejected and common factor variance was found to be 22.51 percent. Therefore, according to the findings of this study, a significant positive relationship exists between extent of involvement and number of hours spent on self learning of computer skills for each of the three types of end-users.

Hypothesis 6: There is no significant relationship between the extent of involvement in T&D activities and perceived usefulness with involvement in T&D activities, for each of the three types of end-users.

The scores of extent of involvement and perceived usefulness with involvement in T&D activities, for each of the three types of end-users, were ranked and Spearman rho test was applied. The results are summarised on Table 4.35 on page 153. First Spearman rho test evaluated Type 1 or Menu end-users and found a correlation coefficient of 0.263 that established a significant relationship at .05 level of significance. The null hypothesis was rejected and common factor variance was 6.92 percent. Then, Spearman rho test evaluated Type 2 or Command end-users and found a

correlation coefficient of 0.418 establishing a significant relationship at .05 level of significance. The null hypothesis was rejected and common factor variance was 17.44 percent. Lastly, Spearman rho test evaluated Type 3 or Programming end-users and found a correlation coefficient of 0.678 establishing a significant relationship at .05 level of significance. The null hypothesis was rejected and common factor variance was found to be 45.99 percent. Hence, according to the findings of this study, a significant positive relationship exists between extent of involvement and perceived usefulness with involvement in T&D activities for each of the three types of end-users.

Hypothesis 7: There is no significant relationship between the extent of involvement in T&D activities and satisfaction derived from training programmes attended, for each of the three types of end-users.

The scores of extent of involvement and satisfaction derived from training programmes, for each of the three types of end-users, were ranked and Spearman rho test was applied. The results are summarised on Table 4.36 on page 154. First Spearman rho test evaluated Type 1 or Menu end-

users and found a correlation coefficient of 0.323 that established a significant relationship at .05 level of significance. The null hypothesis was rejected and common factor variance was 10.44 percent. Then, Spearman rho test evaluated Type 2 or Command end-users and found a correlation coefficient of .750 establishing a significant relationship at .05 level of significance. The null hypothesis was rejected and common factor variance was found 56.28 percent. Lastly, Spearman rho test evaluated Type 3 or Programming end-users and found a correlation coefficient of 0.589 establishing a significant relationship at .05 level of significance. The null hypothesis was rejected and common factor variance was found 34.66 percent. Therefore, according to the findings of this study, a significant positive relationship exists between extent of involvement and satisfaction with training programmes attended for each of the three types of end-users.

Hypothesis 8: There is no relationship between extent of involvement in T&D activities and number of years of experience, for each of the three types of end-users.

To test this hypothesis Spearman rho correlation coefficient was used. The number of years of computer experience and scores of extent of involvement for each of the three types of end-users were ranked. The results are summarised on Table 4.37 on page 154. First Spearman rho test evaluated Type 1 or Menu end-users and found a correlation coefficient of 0.198. The null hypothesis was accepted and common factor variance was 3.92 percent. Then, Spearman rho test evaluated Type 2 or Command and Type 3 or Programming end-users and found a correlation coefficient 0.525 and 0.749 respectively establishing a significant relationship at .05 level of significance. The null hypothesis was rejected and common factor variance was found to be 27.56 percent and 56.10 percent for Type 2 and Type 3 end-users respectively. Therefore, according to the findings of this study, a significant positive relationship exists between extent of involvement and number of years of computer experience for Type 2 and Type 3 end-users. For Type 1 end-users relationship was not found significant. The implication of this finding is discussed in chapter 5.

Hypothesis 9: There is no significant relationship between level of satisfaction with training programmes attended and

number of years of computer experience, for each of the three types of end-users.

The scores of satisfaction with training programmes and number of years of computer experience, for each of the three types of end-users, were ranked and Spearman rho test was applied. The results are summarised on Table 4.38 on page 155. First Spearman rho test evaluated Type 1 or Menu end-users and found a correlation coefficient of -0.316 that established a significant relationship at .05 level of significance. The null hypothesis was rejected and common factor variance was 9.98 percent. Than, Spearman rho test evaluated Type 2 or Command end-users and found a correlation coefficient of -0.318 establishing a significant relationship at .05 level of significance. The null hypothesis was rejected and common factor variance was found to be 10.14 percent. Lastly, Spearman rho test evaluated Type 3 or Programming end-users and found a correlation coefficient of -0.388 establishing a significant relationship at .05 level of significance. The null hypothesis was rejected and common factor variance was found to be 15.06 percent. Hence, according to the findings of this study, a significant negative relationship exists between satisfaction with training programmes

attended and number of years of computer experience for each of the three types of end-users.

Table 4.30 : **Hypothesis 1-ANOVA Single-Factor and Tukey's Method of Multiple Comparison Results -Tests for difference in extent of involvement among the end-users in T&D activities.**

Summary

Groups	*Count*	*Sum*	*Average*	*Variance*
Type 1	80	160.9167	2.0115 (x1)	0.2085
Type 2	80	164.3333	2.0542 (x2)	0.3954
Type 3	80	209.5833	2.6198 (x3)	0.8838

Anova: Single-Factor

Source of Variation

	SS	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	18.4487	2	9.2243	18.6020	0.0000	3.0339
Within Groups	117.5234	237	0.4959			
Total	135.9721	239				

Since F ratio > F critical at .05 level of significance we reject Null Hypothesis

Tukey's Method of Multiple Comparison.

Contrast	T Range	Significant
|x1-x2| = |2.0115 - 2.0542| = 0.04271	0.26060	No
|x2-x3| = |2.0542 - 2.6198| = 0.56562	0.26060	Yes
|x1-x3| = |2.0115 - 2.6198| = 0.60833	0.26060	Yes

Table 4.31 : Hypothesis 1 - ANOVA Single - Factor and Scheffe's Method of Multiple Comparison Results - Tests for difference in extent of involvement in T&D activities among end-users in different functional areas.

Summary

Groups	*Count*	*Sum*	*Average*	*Variance*
Finance	91	212.1667	2.33150 (x1)	0.6006
Marketing	62	118.9167	1.91801 (x2)	0.1577
Personnel	33	95.9167	2.90657 (x3)	1.1119
Production	54	107.8333	1.99691 (x4)	0.2209

Anova: Single-Factor

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	25.0111	3	8.3370	17.7318	0.0000	2.6428
Within Groups	110.9610	236	0.4702			
Total	135.972	239				

Since F ratio > F critical at .05 level of significance we reject Null Hypothesis

Scheffe's Method of Multiple Comparisons

Contrast	S Range	Significant
| x1-x2 | = | 2.33150 - 1.91801| = 0.41349	0.5462	No
| x1-x3 | = | 2.33150 - 2.90657| = 0.57506	0.6740	No
| x1-x4 | = | 2.33150 - 1.99691| = 0.33458	0.5698	No
| x2-x3 | = | 1.91801 - 2.90657| = 0.98855	0.7147	Yes
| x2-x4 | = | 1.91801 - 1.99691| = 0.07890	0.6174	No
| x3-x4 | = | 2.90657 - 1.99691| = 0.90965	0.7329	Yes

Table 4.32: **Hypothesis 3 - Spearman rho Results : Relationship between extent of involvement in T&D activities and number of computer related training programmes attended, for each of the three types of end-users.**

Hypothesis 3	Type 1	Type 2	Type 3
Correlation coefficient(r)	0.081	0.086	0.030
Common factor variance	0.66%	0.73%	0.09%
Confidence level	95%		
Degree of freedom	78		
Correlation coefficient value at .05 level	0.221		
Relationship significant at .05 level	NO	NO	NO
Reject Null Hypothesis	NO	NO	NO

Table 4.33 : **Hypothesis 4-Spearman rho Results : Relationship between the extent of involvement in T&D activities and number of hours spent on computer per week, for each of the three types of end-users.**

Hypothesis 4	Type 1	Type 2	Type 3
Correlation coefficient(r)	0.508	0.039	0.002
Common factor variance	25.82%	0.15%	0.00%
Confidence level	95%		
Degree of freedom	78		
Correlation coefficient value at .05 level	0.221		
Relationship significant at .05 level	YES	NO	NO
Reject Null Hypothesis	YES	NO	NO

Table 4.34: **Hypothesis 5 - Spearman rho Results : Relationship between the extent of involvement in T & D activities and number of hours spent on self learning of computer skills, for each of the three types of end-users.**

Hypothesis 5	Type 1	Type 2	Type 3
Correlation coefficient(r)	0.917	0.807	0.474
Common factor variance	84.15%	65.07%	22.51%
Confidence level	95%		
Degree of freedom	78		
Correlation coefficient value at .05 level	0.221		
Relationship significant at .05 level	YES	YES	YES
Reject Null Hypothesis	YES	YES	YES

Table 4.35: **Hypothesis 6 - Spearman rho Results : Relationship between the extent of involvement in T & D activities and perceived usefulness with involvement in T&D activities, for each of the three types of end-users.**

Hypothesis 6	Type 1	Type 2	Type 3
Correlation coefficient(r)	0.263	0.418	0.678
Common factor variance	6.92%	17.44%	45.99%
Confidence level	95%		
Degree of freedom	78		
Correlation coefficient value at .05 level	0.221		
Relationship significant at .05 level	YES	YES	YES
Reject Null Hypothesis	YES	YES	YES

Table 4.36: **Hypothesis 7 - Spearman rho Results : Relationship between the extent of involvement in T & D activities and satisfaction with training programme attended, for each of the three types of end-users.**

Hypothesis 7	Type 1	Type 2	Type 3
Correlation coefficient(r)	0.323	0.750	0.589
Common factor variance	10.44%	56.28%	34.66%
Confidence level	95%		
Degree of freedom	78		
Correlation coefficient value at .05 level	0.221		
Relationship significant at .05 level	YES	YES	YES
Reject Null Hypothesis	YES	YES	YES

Table 4.37: **Hypothesis 8 - Spearman rho Results : Relationship between the extent of involvement in T & D activities and number of years of computer experience, for each of the three types of end-users.**

Hypothesis 8	Type 1	Type 2	Type 3
Correlation coefficient(r)	0.198	0.525	0.749
Common factor variance	3.92%	27.56%	56.10%
Confidence level	95%		
Degree of freedom	78		
Correlation coefficient value at .05 level	0.221		
Relationship significant at .05 level	NO	YES	YES
Reject Null Hypothesis	NO	YES	YES

Table 4.38: **Hypothesis 9 - Spearman rho Results : Relationship level of satisfaction with training programmes and number of years of computer experience, for each of the three types of end-users.**

Hypothesis 9	Type 1	Type 2	Type 3
Correlation coefficient(r)	-0.316	-0.318	-0.388
Common factor variance	9.98%	10.14%	15.06%
Confidence level	95%		
Degree of freedom	78		
Correlation coefficient value at .05 level	0.221		
Relationship significant at .05 level	YES	YES	YES
Reject Null Hypothesis	YES	YES	YES

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

CHAPTER - 5

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

This chapter is divided into four sections. The first section provides an overview of the study. The second section discusses the general findings and the conclusion drawn from this research. Third section deals with implications of the study and final section attends to the issues related to future research.

5.1 OVERVIEW OF THE STUDY

We are undergoing an information revolution, a time of broad technological change, in which unprecedented "information power" is available to employees. The world is becoming increasingly turbulent. Therefore, efficient monitoring requires more information, making computers an integral part of our corporate life. End-user computing refers to emerging section of employees who use computers in their profession, but are not considered computer professionals.

Effective and efficient information technology and its absorption will be crucial for meeting the challenges of organisational prosperity in the 1990's and early 2000's. Appearance of personal computers in the early eighties has raised the computer literacy requirement of employees. The rising personal computer market suggests that employees will continue to seek higher levels of computer literacy.

With the increasing importance of computer literacy at all levels in the organisation, the issue that needs to be addressed urgently, is that of the end-user support and method of acquiring computer know how in the organisation.

Variety of factors complicates end-user literacy demands. Such as, demand for support surpassing the facility available, high turnover among information systems professionals, and the lack of software standardisation. Further, literacy demands are becoming an unfolding process directly linking to end-user sophistication and technological advances.

All this means that organisation should employ a variety of learning techniques to meet the literacy demand of end-users. One alternative is to develop trainers from

within end-users working in different functional area. This can play a vital role in successful adaptation of information technology by end-users. Training of end-user on PC based software systems alone is not sufficient to motivate end-users. Training on issues related to analysis and use of information for better decision making, is a long term strategic issue that has to be addressed.[1] Since, most of the professionals are strong on technological and software product knowledge, but have little or no functional and application knowledge, involvement of end-users in T&D activities is required to overcome this hurdle.

The purpose of this study was to find the extent of involvement of end-users in T&D activities, measure the end-users level of satisfaction with training programmes and their perception about the role that they play in T&D activities. The purpose of the study was also to identify the most preferred mode of learning and the type of relationship that end-users prefer between trainer and learner. Results derived were used for identifying the factors effecting the extent of involvement of end-users in T&D activities.

End-users were classified into three types, based on the research of Rockart and Flannery:

1) **Menu driven end-users** (Type 1)- who use someone else software through pre-established procedures or menus.
2) **Command level end-users** (Type 2) - who have the ability to manipulate information by using report generators.
3) **Programming end-users** (Type 3) - who use both command and procedural languages to develop applications for their own need and for others.

Eighty end-users were selected from each of the above three categories using quota sampling. A self-reporting questionnaire with Likert type responses was used to assess the degree of end-users involvement in T&D activities, satisfaction with training programme and their perception about the role that they play in T&D activities. This end-user questionnaire was also used for collecting demographic data, total number of hours spent on computer, time spent on self learning to improve their computer skills, number of years of computer experience, number of training programmes attended and most preferred mode of learning.

5.2 OVERVIEW OF THE RESULTS AND CONCLUSIONS

5.2.1 Difference among End-user types

Type 1 end-users comprised the highest percentage of females, the lowest mean age, lowest level of formal education, the lowest level of computer experience, lowest number of hours of computer usage. Type 1 end-users were in a typically clerical position. They used personal computer mostly for word processing and data entry. Thus having a routine type of computer related job responsibility.

Type 2 end-users ranged from clerical to mangers to professional staff to line managers to staff specialist. Their demographic data, extent of involvement in T&D activities and satisfaction with training programme generally ranged between the Type 1 and Type 3 end-users. Their computer applications included word processors, spreadsheet packages, graphic generators, desktop publishing programs, database and query languages.

Type 3 end-users comprised the highest percentage of males, the highest mean age, highest level of formal education,

the highest level of computer experience, highest number of hours of computer usage. They had integrated personal computer into their job. Most of them were either working in Production or in Finance area. Type 3 end-users ranged from supervisor to engineer to accountant to financial analyst to corporate planner. Their extent of involvement in T&D activities was highest. Approximately 31 percent of the total time that they spent on computer was devoted to improving their skills. Therefore, the researcher concludes that they exert a lot of effort to remain update with the changing technology. Typical applications for this group of end-users are word processing, spreadsheet, spreadsheet macros, data base management systems (DBMS), query languages, fourth generation non-procedural languages, report generators, graphic programs and project management packages.

5.2.2 Extent of involvement in T&D activities.

The first hypothesis tested whether there is a difference in the extent of involvement in T&D among the three types of end-users. ANOVA single factor test was applied and it was found that there is a significant difference between the extent of involvement. Subsequently, using Tukey's

Method of Multiple Comparison, it revealed that Type 3 (programming end-users) end-users were more involved in T&D activities compared to Type 1(Menu end-users) and Type 2 (Command end-users).

The next point of interest would be the nature of involvement of end-users in T&D activities. The findings of this study have shown that responding Type 1 and Type 2 end-users are mostly involved in the activities related to pre-training phase of the training process. Most of the time they are involved in determining the content of training, identifying training needs and initiating training programmes. In training phase they are usually involved with scheduling training sessions followed by training and instructing others. They have a very negligible role in preparing reading materials. Their involvement in evaluating training programme in terms of overall effectiveness, content and methods used, the participant's attitude and behaviour, trainer behaviour and participant's behaviour on the job is also limited. On the other hand, Type 3 end-users are equally involved in all the three phases of training process. The average response of 2.011, 2.054 and 2.620 for Type 1, Type 2 and Type 3

end-users, respectively, indicates that involvement of end-users in T&D activities is in an infancy stage.

The second hypothesis shows that end-user in Personnel area are more involved in T&D activities as compared to end-users in Finance, Marketing and Production area. Difference in the mean score may be because of the nature of their job. The mean score for end-users in the Finance area was higher than that of end-users in Production and Marketing area. This may be attributed to more years of computer experience of end-users in Finance area.

Hypothesis three to eight tested the relationship between the extent of involvement in T&D activities and other related variables for each of the three types of end-users. The variables considered for finding relationship were number of computer related training programmes attended; number of hours spent on computer; number of hours spent on self learning of computer skills; perceived usefulness with involvement in T&D activities; satisfaction with training programmes and number of years of computer experience.

Testing the third Hypothesis founds no significant relationship between extent of involvement in T&D

activities and number of computer related training programmes attended within two years preceding the study. Therefore, it may be concluded that by holding a large number of training programmes may not necessarily increase the involvement of end-users in T&D activities.

The mean number of programmes attended was highest for Type 3 end-users followed by Type 1 and Type 2 end-users. Further, most programmes that they attended had external faculty. This may be attributed to the fact that organisations do not have qualified trainers. This may lead to mismatching of tools and tasks as external consultants (IT professionals and vendors) do not fully understand the needs of end-users and lack functional and application knowledge.

Fourth hypothesis shows a positive relationship between extent of involvement in T&D activities and number of hours spent on computer per week by end-users type. Though relationship was not significant for Type 2 and Type 3 end-users it was significant for Type 1 end-users. This may be attributed to the fact that Type 1 end-users are more motivated due to their new experience with computers. Reduction in correlation as one moves from unskilled to

skilled end-users may be due to cumulative effect of computer literacy over a period.

The fifth hypothesis that evaluated the relationship between the extent of involvement in T&D activities and hours spent on self learning of computer skills showed significant positive relationship between them. This implies that as end-users master a set of computer related skills they try to learn more complex skills. It may also be concluded that the organizations should be supportive of personal computer use for self directed learning. This in turn may increase the involvement of end-users in T&D activities, making training sessions more meaningful and subsequently using them as trainers.

Testing of hypothesis six showed a significant positive relationship between extent of involvement in T&D activities and perceived usefulness with the involvement in T&D activities for each of the three types of end-users. Since most of the end-users feel that their involvement in training programme is very useful. Consulting and involving them properly will lead to better understanding of the information system and will help them to learn new skills in a better way.

The seventh hypothesis also found a significant relationship between extent of involvement and satisfaction with training programmes attended. Thus to make training programme more meaningful their involvement in T&D activities is necessary.

Hypothesis eight found a significant positive relationship between extent of involvement in T&D activities and number of years of computer experience for Type 2 and Type 3 end-users, concluding that as end-users gain experience they get more involved in T&D activities.

5.2.3 Satisfaction with training programme

In the entire sample only 35 percent of the end-users were satisfied with training programmes attended in the last two years preceding the study. The end-user wise breakup shows that Type 1 end-users were most satisfied with 37.50 percent indicating satisfaction with training programmes. The percentage of end-users satisfied, in Type 2 and Type 3 category, were 33.75 percent. For all categories of end-users significant negative relationship were found between the satisfaction derived from training programmes and number of years of computer experience. Showing that as

their experience increases with computers they find training programme less educative. This may be attributed to the lack of depth in training programmes. This is further supported by the fact that end-users in more technical areas such as Production and Finance were less satisfied than end-users in Personnel and Marketing areas.

5.2.4 Perceived usefulness of involvement in T&D activities

Majority of the end-users in all the three categories indicated that they perceive their role in T&D activities as very useful and constructive. Type 3 end-users were most satisfied by their role in T&D activities followed by Type 2 and Type 1 end-users. When the end-users were asked to identify the most preferred relationship between trainer and learner in training programme, 46 percent said that they believe in "both the trainer and learner should work together in designing and carrying out training programmes"; 30 percent said that "the trainer or learner should dominate the design and carrying out of training programmes while other play only a minor role; 20 percent saw "trainer should only design and implement training programmes"; and the remaining 4 percent saw trainer and

top manager should design and implement training programmes. This indicates that end-users want to get involved in training programmes and when they get an opportunity to do so they appreciate it and find it very useful.

5.2.5 Other findings

This study asked the end-users to specify their most preferred type of learning resource. The end-users gave preference to peers followed by reference manual/ text books/workbooks showing that they find themselves in a more comfortable position with peers and are in a better position to interact with them. High preference of end-users for peers in all the categories has a significant implication for trainers. The researcher believes that proper recognition is not given to this type of resource. Preference to formal classes goes down as the end-users move from menu to command to programming end-user. Further, importance of experimentation/trial and error increases as end-users become more skilled. The researcher believes that reliance on experimentation is attributable to the advanced nature of the expertise required for Type 3 end-users. Low usage of computer tutors as the end-users

increases their skill may be attributed to the lack of depth in most of the tutors, coupled with the availability of peers and willingness to experiment.

5.3 IMPLICATIONS OF THE STUDY

This section discusses the theoretical as well as practical implications resulting from this study. This chapter also offers practical alternatives to existing practices in the training and development profession.

5.3.1 Theoretical Implications

Several aspects of this study support earlier adult learning and training research in this area. They are.

1) The study observed a high level of self-directed learning activity within all types of end-users. Further, as end-users gain experience with computer they tend to be more involved with T&D activities. They rely more on experimental techniques such as utilising the experiences of co-worker, experimentation/trial and error, and other action learning techniques. This is

consistent with M.S. Knowles[2] findings that adult learning process tends to be problem oriented and as they grow older they rely less on traditional teaching and more on experimental techniques that utilise the experience of other learners.

2) A positive correlation was found between extent of involvement in T&D activities and number of hours spent on self learning, supporting earlier researches conducted by L.M. Guglielmino and P.J. Guglielmino,[3] and A. Tough[4]. These researches also identified the importance of self directed learning and learning resource centers as an important aspect of innovative and future oriented training systems.

3) In this study a positive correlation was found between extent of involvement and number of years of computer experience for Type 2 and Type 3 end-users. While a negative relationship was observed between level of satisfaction with training programmes and number of years of experience. Further, as end-users gained experience and moved from Type 1 to Type 3 they increasingly

relied on peers and experimentation/trial and error as a resource. All these supports A.H. Maslow[5] findings that as adult learner masters a set of skills he goes in for richer and more complex experience.

4) After interviewing numerous end-users in varying positions inside the organisations, it was found that end-users expressed the importance of learners' role in designing and implementing training programmes. They preferred individual end-user or group of end-users working together along with trainers in designing and implementing of training programmes. Thus, highlighting the importance of team work in future training programme. This conclusion is supported by the findings of B. Geber.[6]

5) The study found that extent of involvement in T&D activities is positively correlated to the level of satisfaction and perceived usefulness of end-users involvement in T&D activities. This indicates that there are psychological dimensions

to implementation of information systems that cannot be ignored.

5.3.2 Practical implications

The findings of this study provide many practical implications for raising computer literacy of end-users in organisations. The extent of involvement in training and development is influenced by number of factors they are: number of hours spent on self learning; perceived usefulness of involvement in T&D activities; satisfaction with training programmes, number of years of experience with computers. Therefore, in this section, the researcher discusses the practical implications of the findings as policy recommendation for future training programmes.

1) In this study it was found that end-users find it useful to be involved in T&D activities. But at the same time their extent of involvement in all the three phases (i.e., pre-training phase; training phase; and post - training phase) of training is less and in an infancy stage. Therefore, effort should be made by the organisations to involve qualified end-users in

T&D activities. As end-users attitude towards involvement in T&D activities is positive the organisation will not need much effort to involve them in T&D activities. The researcher advocates that all end-users effected directly or indirectly by training and development should be involved from the inception to the implementation of computer training programmes.

2) R.S. Pawar[7] has identified new roles of active end-users, defacto end-users, and functional specialist end-users in Indian context. Active end-users are executives who have become conversant with PCs and use spreadsheet and database with certain degree of comfort. While, defacto end-users are executives and other professionals in the organisations who have acquired a very high level of skills in the use of wide range of software tools on PCs. They are widely consulted by other departments in the organisation to solve PC related software development problems. Due to high level of acceptance that they are receiving they have started playing a parallel role to the EDP

function. On the other hand there are also functional specialists. This category includes senior executives/professional from various departments, who have high level of skill in their functional area. They have started taking interest in computers and as they have access to powerful software tools they have become a source for most powerful applications of computers. The involvement of peers in training process is strongly supported by this study. Therefore, the service of these types of end-users can be taken for designing and implementation of training and development programmes. These end-users are in a better position to assess the literacy need of novice end-users, which will help speeding the process of identifying and addressing the computer literacy needs. But before embarking on such a policy these types of end-users should be trained in the rudiments of training and development skills.

3) The companies should encourage qualified end-users to participate in T&D activities with the aim of making them familiar with the rudiments of

training and counselling others. This will help the organisations to increase the computer literacy of end-users and help identifying the most potential group of end-users who may act as trainers.

4) Effort should be made to involve end-users in all the phases of training process. At present Type 1 and Type 2 end-users are mostly involved in the pre-training phase of the training process. They hardly participate in training and post-training phase of the training process. This will go a long way in developing end-users as trainers.

5) Most of the training programmes are conducted by using external faculty comprising information system specialists or vendors. Since these people are external to the organisation, they are not familiar with the working of the organisation. Such training lacks depth and is skill oriented. The end-users are hardly trained to use computers to enhance their decision making power. Therefore, to make training more meaningful end-users from different functional areas should

be asked to participate in all the phases of training process along with external faculty. This will help qualified end-users to keep themselves abreast with the changing technology. Further, it will overcome the lack of functional and application knowledge of information system professionals and vendors who are engaged in the training of end-users. Thus, creating a learning environment in the organisation not just increasing computer literacy.

6) Conducting more training programmes and encouraging end-users to spend more time on computers alone will not increase their involvement in T&D activities. Self learning should be encouraged as positive correlation was found between extent of involvement and time spent on self learning. In other words, the study shows that the sole use of traditional training programmes is not sufficient. Self directed learning should also be formally recognised within the organisation.

7) The researcher advocates that computer training should not be only skill oriented and knowledge

based. Conceptual and interpersonal skills should also be imparted by the organisation along with computer skills. This will lead to better interaction among end-users and will help them in applying, in an efficient and effective way, new skills learned to their jobs. Further, end-users whether they are workers, supervisors or managers should be imparted both types of training. This will help the end-users to learn from each other experience irrespective of their position in the organisation.

8) At present trainees are asked to adjust with the training programme. The need is to adjust training programmes to the needs of the end-users. The researcher advocates individualised approach to training. Job requirements and demographics should become a part of the planning process for enhancing the computer literacy of end-users. Further, training programme should be problem oriented rather than subject oriented as adult learner tends to be problem oriented in their learning process.

9) The study finds an increased trend toward computer related training as end-users move from Type 1 to Type 3 end-users. Type 3 end-users spends a higher percentage of their total time on computer for improving their skills compared to the other two types of end-users. As a result increased emphasis should be given on developing a variety of learning resources such as peers, experimentation, reference manuals, tutorials and not just formal classes to meet the growing demand for computer literacy.

10) The organisations should leave the options on individuals to decide how to learn while retaining control over the framework of education and training. Earlier researches have also shown that learner who can use their preferred resources tend to report higher satisfaction with learning projects.

11) The company should try to develop a culture within the organisation in which end-users learn from each other irrespective of their position in the organisation. Simultaneously qualified end-

users should feel proud in instructing and facilitating a class. The idea falls in the line of Boston Computer Society. The society relies on volunteers to raise the computer literacy of its members. Their idea is simple, share your knowledge and others will do the same. This can be an effective method as it supports the findings of M. Knowles[8] that as individual grows and mature they rely less on traditional method of learning and more on experimental techniques that use field experiences of learner, group discussion, simulation and other action - learning techniques.

12) It is unreasonable to assume that end-users will assimilate volumes of information on computer usage beside maintaining other skills required to perform their jobs. Therefore, to ease the pressure of learning the companies can go in for software standardisation for controlling the demands for constantly increasing level of computer literacy. This will slow the rate of change thus allowing time for educational process to complete.

13) Training and development personnel in the organisation should become proactive in addressing the changing environments. They will have to be innovative in order to meet new computer training needs in the organisation.

14) The companies should maintain indexes of end-users within the organisation, who have been trained as trainers and has specific expertise in areas related to end-user computing. This will help the end-users to quickly identify the persons whom they should contact in case they have problems.

15) This study has documented the willingness of end-users to exchange information and develop their own computer literacy skills. Therefore, companies should go in for networking rather than stand alone systems as it will help end-users to interact with each other and share their experience.

5.4 DIRECTION FOR FUTURE RESEARCH

Based on the research work undertaken the following are the future research recommendations:

1. The effectiveness of peers as a resource for self learning needs evaluation. Pre-tests and post-tests along with longitudinal studies may be used for finding out changes in performance of end-users who are trained by their peers.

2. There is a need to identify the potential group of end-users among manager, executives and professional staffs who may act as trainers.

3. Research is required to identify the attributes that are essential for end-users to become effective trainers.

4. This study may further be extended by studying the end-users by company size, culture, competition and technology base.

5. Longitudinal studies though difficult will be useful in assessing how the extent of involvement in T&D activities changes over a period due to various motivational techniques.

6. The research is needed to find out the perception of training and development staff regarding the learners' role in needs assessment, design, and implementation phases of training process.

7) Research is needed to consolidate the findings of researches related to end-user computing so that the industry and end-users may obtain maximum benefit from the researches.

REFERENCES

1. Koong, K., and Liu, C.L, " From computer literacy to end-users self-sufficiency", Information Executive, 4(2), 1991, pp. 54-57.

2. Knowles, M.S., The Adult Learner: A Neglected Species, Houston, Texas, Gulf Publishing, 1973.

3. Guglielmino, L.M., and Guglielmino, P.J., " Self - directed learning in business and industry: An information age imperative," in Long, H.B., (ed.), Self - directed learning: Application and theory, Georgia, University of Georgia, 1988.

4. Tough, A., "Major Learning Efforts: Recent Research and Future Directions", Adult Education, 2(8), 1978, pp. 250-263.

5. Maslow, A.H., Motivation and Personality, 2nd edition, Harper and Row, New York, 1970.

6. Geber, B., "Goodbye classroom (Redux)", Training: The magazine of Human Resources, 27 (1), 1990, pp. 27-39.

7. Pawar, Rajendra S.,"IT Manpower in India: The Burning Issue", in Bhatnagar, S.C.(ed.) Information Technology Manpower, New Delhi, Tata McGraw-Hill Publishing Company Limited, 1992.

8. Knowles, M.S., Op. cit.

BIBLIOGRAPHY

Agarwal, M.C.,"Training of graduate engineer trainees", Indian Journal of Training and Development, 12(3&4), 1982, pp. 17-18.

Alavi, M., and Weiss, I.R., "Managing the Risks Associated with End-User Computing", Journal of Management Information Systems, 2(3), 1986, pp. 5-20.

Amoroso, D. L., "Organisational issues of end-users computing", Database, 19(3/4), 1988, pp. 49-58.

Anthony, R.N., Planning and Control Systems:A Framework for Analysis, Cambridge, Mass.: Howard University Press, 1965.

Argyris, C., Organisation and Innovation, Illinois, Richard D. Irwin, Inc., and the Dorsey Press, 1965.

Banerji, K., " Evaluation of training- A study of supervisory development", Indian Journal of Training and Development, 11(4), 1981, pp. 150-155.

Baronas, A.K., and Louis, M.R., "Restoring a sense of control during implementation: How user involvement leads to system acceptance", MIS Quarterly, 12(1), 1988, pp. 111-126.

Basha, M.M.A., "Training techniques in varying cultures: American methods for India", Integrated Management, 59, 1971, pp. 43-48.

Bergevin, Paul., A philosophy for adult education, New York, Seabury, 1967.

Bhatia, S.K., "Trends in Training and Development", Indian Journal of Training and Development, 11(4), 1981, pp. 142-145.

Bhatnagar, O.P., Evaluation Methodology for Training: Theory and Practice, New Delhi, Oxford & IBH Publishing Co. Pvt. Ltd., 1987.

Bhatnagar, S.C., and Ramani, K.V., Computer and Information Management: a primer for practicing managers, 2nd edition, New Delhi, Prentice-Hall of India Private Limited, 1991.

Bridges, William., Surviving corporate transitions, New York, Doubleday, 1988.

Brown, F.E., Marketing Research: A Structure for Decision Making, California, Addison-Wesley Publishing Company, 1980.

Cerullo, M.J., "Information Systems success factors", Journal of System Management, December, 1980, pp. 10-19.

Chatterjee, N.N., "Management of Personnel in Indian Enterprises: concepts, Practices and Emerging Trends, Calcutta, Allied Book Agency, 1978.

Chopra, R.K., Management of Human Resources, V.K. Publishing House, Bareilly, 1989.

Cross, K. Patricia., Adults as learners; Including perceptions and facilitation learning, San Franciasco, Jossey-Bass, 1981.

Davis, G.S., and Olson, M.H., Management information systems: Conceptual foundation, structure and development (2nd ed.), New York, McGraw-Hill, 1985.

de Nevfville, R., "System Analysis - a decision process", IMR, Spring, 1970, pp. 48-58.

DeBrabander, B., and Edstron, A., "Successful information systems development projects", Management Science, 24(2), 1977, pp. 191-199.

Department of Electronics, Annual Report: 1980-81, Government of India, New Delhi, 1981, p. 43.

Desai, A.N., Research Methodology in Management, New Delhi, Ashish Publishing House, 1990.

Diwan, P., "Business of Computer Training", Information Technology, May, 1993, pp. 48-49.

Doll, W.J., "The Measurement of End-User Computing

Satisfaction", MIS Quarterly, 12(6), 1988.

Doll, W.J., and Torkzadah, G., " End-user computing involvement: Discrepancy model", Management Science, 35(10), 1989, pp. 1151-1171.

Elias, John L. and Merriam, Sharan., Philosophical foundations of adult education, Malabar, Florida, Robert E. Krieger Publishing Company, 1984.

Farmer, J., Buckmaster, A., and LaGrand, B., "Situational specific approaches", Lifelong learning: An amnibus of practice and research, 12(3), 1988, pp. 8-13.

Franz, C.R., and Robey, D., "Organizational context user involvement and the usefulness of information systems", Decision Sciences, 17, 1986, pp. 329-356.

Freeland , David., "Your personal Computer Isn't Yours Anymore: Scenarios for the next Wave in End-User Computing", Computerworld, August, 1987, pp. 69.72.

Geber, B., "Goodbye classroom (Redux)", Training: The magazine of Human Resources, 27 (1), 1990, pp. 27-39.

Gerrity, Thomas P., and Rochart, J.F., "End-User Computing: Are you a Leader or a Laggard?", Sloan Management Review, 28(4), 1986, pp. 25-34.

Gerrity, T P., and Rockart, J F., "Are you a leader or a laggard", Sloan Management Review, 28(4), 1986, pp. 25 -34.

Gibaldi, J., and Achtert W.S., MLA Handbook for Writers of Research Papers, 3rd edition, New Delhi, Affiliated East-West Press Private Limited, 1991.

Ginzberg, M.J., "Steps toward more effective implementation of MS and MIS", Interfaces, 8(3), 1978, pp. 57-63.

Gopalkrishnan, C. and Achutan, S.. "Focus on Training programmes", Financial Express, August 28, 1985, p. 4.

Gorry, G. A., and Morton, N.S.,"Framework for Management Information Systems", Sloan Management Review, 13 (1), 1971, pp. 55-70.

Government of India, Electronic Commission, `Manpower', Perspective Report on Electronics in India, New Delhi, June 1975, pp. 655-665.

Groebner, David F & Shannon, Patrick W., Business Statistics: A Decision Making Approach, Ohio, Charles E. Merrill Publishing Co., 1981.

Guenther, W.C., Analysis of Variance, Englewood Cliffs, N.J., Prentice - Hall, 1964.

Guglielmino, L.M., and Guglielmino, P.J., " Self - directed learning in business and industry: An information age imperative," in Long, H.B., (ed.), Self - directed learning: Application and theory, Georgia, University of Georgia, 1988.

Guglielmino, L.M.,Development of the Self-directed Learning Readiness Scale, Unpublished Doctoral Dissertation, University of Georgia, 1977.

Hammond, L.W., "Management Considerations for an Information Center", IBM System Journal, 21, 1982, pp. 131-161

Hawkins, C.A., and Weber, J.E., "Statistical Analysis: Applications to business and economics, Harper and Row Publishers, New York, 1980.

Head, R. V., "Information Resource Center: A NEW Force in End-User Computing", Journal of Systems Management, February 1985, pp. 24-29.

Henderson, J. C., and Michael, E.T., "Manageing End-User Computing for Competitive Advantage", Sloan Management Review, Winter, 1986, pp. 3-14.

Information Systems Management in Practice, ed. Ralph H. Sprague, Jr. and Barbara C. McNurlin, USA, Prentice - Hall International, Inc., 1986.

Isaac, Stephen and Michael, William., Handbook in research and evaluation, 2nd edition, San Diego, California, Edits Publishers, 1981.

Ives, B., and Olson, M.H., "User involvement and MIS research: A review of research", Management Science,

30(5), 1984, pp. 586-603.

Jain, K.K., Training and development in public enterprises - A case study of Indian Iron and Steel Industry, Lok Udyog, 18(11), 1985, pp. 21-27.

Jones, M. and McLean, E., "Management problems in large-scale software development projects", Industrial Management Review, Spring, 1970, pp. 1-15.

Keen, P.G.W., and Morton, M.S., Decision Support Systems: An Organizational Perspective, Reading, Mass., Addison-Welsey, 1978.

Kerlinger, Fred N., Foundations of Behavioral Research,New Delhi, Surjeet Publications, 1983.

Kishore. S., and Naik, R., What every Manager should know about Computers, New Delhi, Tata McGraw-Hill Publishing Company Limited, 1991.

Knowles, Malcolm., The history of adult education movement in the United States, (rev. ed.), New York, Krieger, 1977.

Knowles, M.S., The Adult Learner: A Neglected Species, Houston, Texas, Gulf Publishing, 1973.

Knowles, Malcolm., The modern practice of adult education: Andragogy versus pedagogy, New York, Association Press, 1970.

Kochan, T., Cutcher-Geshenfeld, J., and McDuffie, J.P., Employee participation, work redesign and new technology: Implications for public policy in 1990's, Submitted to Commission of Workforce Quality and Labour Market Efficiency, Washinton, DC.,1989.

Koong, K., and Liu, C.L, " From computer literacy to end-users self-sufficiency", Information Executive, 4(2), 1991, pp. 54-57.

Kothari, C.R., Research Methodology: Methods and Techniques, New Delhi, Wiley Eastern Limited, 1988.

Kraut, R., Dumais, S., and Koch, S., "Computerization, Productivity, and quality of work-life", Communication of the ACM, 32(2), 1989, pp. 220-238.

Laudon, K.C., and Laudon, J.P., Management Information Systems: A Contemporary Perspective, Singapore, Macmillan Publishing Company, 1990.

Lees, J.D., "Successful development of small business information systems", Journal of Systems Management. 38(8), 1987, pp. 32-39.

Lehmann, Donald R., Marketing Research and Analysis, 3rd ed., IRWIN, Boston, 1989.

Leithesiser, R.L., and Wetherbe, J.C., Avoiding the Pitfall of End-User Computing, (MISRC-WP-85-09), Management Information Systems Research Center, School of Management, University of Minnesota, 1984.

Levine, D. and Strauss, G., Employee participation and involvement, Berkeley, California, University of California, 1989.

Levine, D. and Tyson, L.D., Participation, productivity, and the firm's environment, Berkeley, California, University of California, 1989.

Levy, Amir., "Second order planned change: definitions and conceptualization", Organisational Dynamics, 1988, pp. 5-20.

Londoner, Carroll A., "The system approach as an administrative and program planning tool for continuing education", Educational Technology, 1972, pp. 24-30.

Lovelady, Louise., "Change strategies and the use of OD consultants to facilitate change", LODJ, 5(2), 1984, pp. 3-9.

Lucas, H.C., Information system concepts for Management, New York, McGraw- Hill, 1978.

Lucas, H.C., Walton, E.J., and Ginzberg,M.J., "Implementing packaged software", MIS Quarterly, 12(4), pp. 537-550.

Ludlum, D. A., "MIS Shares Influence: End-User Control Growing Share of System Budgets", Computerworld,

April, 1987, pp. 79.

Lynton, R.P., Pareek, U., Training for Development, Bombay, D.B. Taraporevala Sons and Co. Private Ltd., 1973.

Maheshwari, B.L., "Formal training, skills development and job performance", ASCI Journal of Management, 11(1), 1981, pp. 28-38.

Major, M., "DSS embraces new environments", Software News, 5(9), 1985, pp. 41-50.

Martin, J., Application Development without Programmers, New Jersey, Prentice-Hall, 1982.

Maslow, A.H., Motivation and Personality, 2nd edition, Harper and Row, New York, 1970.

Miller, H., "End-Users Drive Benefit Analysis", Computerworld, August, 1987, pp. pp.59-62.

Miller, J.G., and Miller, J.L., "The earth as a system", Behavioral Science, 27, 1982, pp. 303-322.

Miller, J. and Doyle, B.A., "Measuring the effectiveness of computer-based information systems in financial service sector", MIS Quarterly, 11(1), 1987, pp. 107-124.

Mohan, L. and Belrado, S ., "A Contingency Approach to Managing Information Technology in Developing Nations: Benefiting from lessons learned in Developed Nations", in Bhatnagar, S.C. and Bjorn-Anderson, N. (eds.), Information Technology in Developing Countries, North Holland, 1990.

Mumford, E., and Banks, O., The computer and the clerk, Slasgow, England, The Villafield Press, !967.

Naisbitt, R., Megatrends, New York, Waner Books, 1982.

Nelson, R.R. and Cheney, P.H., "Educating the CBIS user: A case analysis", Data Base, 18(2), pp. 11-16.

Nunnally, Jum C., Test and Measurements: Assessment and Prediction, New York, McGraw-Hill, 1959.

Parker C.S., Management Information Systems: Strategy and

Action, Singapore, McGraw-Hill Publishing Company, 1989.

Pawar, Rajendra S., "IT Manpower in India: The Burning Issue", in Bhatnagar, S.C.(ed.) Information Technology Manpower, New Delhi, Tata McGraw-Hill Publishing Company Limited, 1992.

Peter, T., Thriving on chaos: Handbook for a management revolution, New York, Alferd A. Knopf, 1987.

Peterson, R., "Giving End-Users the MIS Seal of Good System Building", Computerworld, June, 1987, pp. 83-86.

Pliskin, N., "Human resource management: Guidelines for effective introduction of microcomputer technology", Journal of Information System Management, Spring, 1989, pp. 51-58.

Popham, W. James.," The new world of accountability: In the classroom", in Decarlo, J and Mason, C.(eds.), Innovations in education for seventies: Selected readings, New York, Behavioral Publications, 1973.

Powers, R.F., and Dickson, G.W., "MIS project management: Myths, opinion and reality" California Management Review, 1973, 15(3), pp. 147-156.

Prahalad, C.K. and Thiagarajan, K.M., Human relations training in India, ISTD Review, 1(6), 1971, pp. 19-23.

Puri V.K., Fundamentals of Statistical Methods, New Delhi, Allied Publishers Private Limited, 1984.

Raho, L.E., Belohlav, J.A. and Fiedler, K.D., "Assimilating new technology into the organisation: An assessment of McFarlan and McKenney's model", MIS Quarterly, 11(1), 1987, pp. 47-57.

Raman, R., "Computer Courses: A Wholesale Business", Dataquest, 12 (6), 1994, pp 84-98.

Rao, T.V. and Abraham, E, S.J., "Human Resource Development Practices in Indian Industries: A Trend Report", in Rao, T.V., and Pereira, D.F. (eds.), Recent Experiences in Human Resources Development, New Delhi,

Oxford & IBH Publishing Co., 1986.

"Report of the Panel on Computer Manpower Development", IPAG Journal, November 1980, pp. 55-70.

Robins, S.P., Organizational theory: Structure, design, and applications, NJ, Prentice Hall, 1987.

Rockart, J.F.,& Flannery, L.S., "The Management of End user Computing."Communications of the ACM, 26, 1983, pp. 776-784.

Rockart, J.F., "The line takes the leadership - IS management in a wired society", Sloan Management Review, 29(4), 1988, pp. 57-64.

Rockhart, J.F., and Flannery, L.S., "The Management of End User Computing", Communications of the ACM, 26, 1983, pp. 776-784.

Rogers, Carl R., Freedom to Learn, Columbus, Ohio, Charles E. Merrill, 1969.

Roy, A., "Computer Education Scenario in India", in Bhatnagar, S.C., (ed.), Information Technology Manpower: Key Issues for Developing Countries, New Delhi, Tata McGraw-Hill Publishing Company Limited, 1992.

Rushinek, A. and Rushinek, S.F., "Training Software (TS) case study: Feature selection systems (FSS) for computer personnel", Computer Personnel, 1989, 12(1), pp. 13-20.

Saiyadain, Mirza S., Human Resources Management, New Delhi, Tata Mc Graw-Hill Publishing Company Limited, 1988.

Saiyadain, Mirza S., "Training Functions in India", Indian Journal of Training and Development, 17(2), 1987, pp. 3-23.

Saiyadain, M.S., Training in public enterprises: Problem and suggestions", in Ravinder, S. and Mishra, R.K. (Eds.), Educational and Training of Public Enterprise Personnel, New Delhi, Oxford and IBH Publishing Co., 1984.

Schreier, J., "Megatrends for training and development: Direction for the future", Address delivered to the American Society for Training and Development National conference and Exposition, Dallas, Texas, May, 1984, pp. 15.

Scott, W.L., and Spriegel, W.R., Personal Management: Principles, Practices, and Point of View, New Delhi, Tata McGraw-Hill Publishing Company Limited, 1986.

Senn, J.A., " A management view of system analysts: Failures and shortcomings", MIS Quarterly, 2(3), 1978, pp. 25-32.

Seth, P.,"Impact of Training on personnel managers", Productivity, 25(2), 1984, pp. 207-216.

Sharma, S.K.,"Changing dimensions of MIS: and end-user computing", Indian Management, Feb-March, 1993 pp. 7-23.

Singh, A.K., Tests, Measurements and Research Methods in Behavioural Sciences, New Delhi, Tata Mc Graw-Hill Publishing Company Limited, 1986.

Singh, R., and Bhatia, G., "Computer Training Syndrome", Telematics India, August, 1993, pp. 16-28.

Sinha, D., "Attitudinal changes in training programme", Indian Journal of Training and Development, 14(2), 1984, pp. 66-69.

Skineer, Burrhus F., Beyond freedom and dignity, New York, Alfred A. Knopf, 1971.

Special Training Schools: Powering Skills", Computer Today, July 1994, pp. 83-114.

Srinivasan, A.V. and Virmani, B.R., "Action learning programme", Lok Udyog, 11(1), 1977, pp. 9-18.

Steinmetz, Lawrence L., "Age: Unrecognised Enigma of Executive Development", Management of Personnel Quarterly, 8(3), 1969.

Stoll, M., "Teaching Users to Teach Themselves", PC Week, September, 1987, p. 59.

Subramanian, C.R., India And The Computer: A Study of Planned Development, Delhi, Oxford University Press, 1992.

Subramanyam, L., "Management through technology", PC Quest , October, 1992, pp. 18-21.

Subramanyam, L., "Industry Focus: Computer Training", PC Quest, November, 1992, pp. 47-50.

Subramanyam, L., "The trainers and the trained", P C Quest, December, 1992, pp. 120.

Toffler, A., The third wave, New York, Bantam Books Inc., 1980.

Tough, A., "Major Learning Efforts: Recent Research and Future Directions", Adult Education, 2(8), 1978, pp. 250-263.

Tozer, Edwin E., Planning for Effective Business Information Systems, Oxford, Pergamon Press, 1988.

Vittal, N., "The DOEACC Scheme: In Search of Excellence", Computer and Communication, June 1992, pp. 66-71.

Ward, J., Griffits, P., and Whitemore, P., Strategic Planning for Information System, Chichester, John Wiley and Sons, 1990.

Welke, R.J., "User-oriented approaches to MIS", CA Magazine, 112(8), 1979, pp. 62-68.

Zikmund, Willaim G., Business Research Methods, Florida, The Dryden Press, 1988.

Zmud, R.W., "Individual differences and MIS success: A review of the empirical literature", Management Science, 25(10), 1979, pp. 966-979.

APPENDICES

APPENDIX A

LETTER TO ORGANISATIONS

Dear Sir/Madam,

We are conducting research to discover the end-users extent of involvement in computer related Training and Development activities. Their satisfaction with computer related training programmes, and their preferred mode of learning. This study will help improving the training environment within the organisation.

I therefore, request you to suggest the names of the employees who use computers and can be interviewed. All the information collected from the respondents will be kept strictly confidential. Only the researcher will have access to it. Your company name will not appear any where in the study.

If you like to have a copy of the findings of this research, please fell free to contact me. Any questions you may like to ask are also welcome.

Thanking you for your cooperation.

Yours sincerely,

(ASHRAF NAIM)
Department of Business Administration
Aligarh Muslim University
Aligarh, 202 002

APPENDIX B

LETTER TO PARTICIPANTS

Dear Participants,

We request you to participate in our research study on Training and Development of End Users. The study is being conducted to obtain information about your attitude and the extent of involvement in computer related Training and Development activities. This information will help improving the training environment within the organisation.

We like to have the permission to interview you on this topic and share your experience with us. This will just require 15-30 minutes of your time.

Participation in this study is voluntary. You may withdraw from the study any time or may refuse to answer any question on the questionnaire.

We assure you of complete confidentiality. Only for statistical analysis data will be used and will not be linked to any person.

If you agree to participate in this project, please fill the preliminary questionnaire attached with this letter, suggesting the date and time when you will be available.

Thanking you for your cooperation.

Yours sincerely,

(ASHRAF NAIM)
Department of Business Administration
Aligarh Muslim University
Aligarh, 202 002

PHASE I : QUESTIONNAIRE

Q.1 Name _____

Q.2 What is you present position in the organisation

_____

Q.3 Please indicate the percentage of work day you spend working directly on the computer (Please tick the appropriate category)

[ ] 0 to 10%
[ ] 10 to 20%
[ ] 20 to 30%
[ ] 30 to 40%
[ ] 40 to 50%
[ ] 50% or more

Q.4 Please indicate the percentage of work day you spend working indirectly with computer e.g using reports etc.(Please tick the appropriate category)

[ ] 0 to 10%
[ ] 10 to 20%
[ ] 20 to 30%
[ ] 30 to 40%
[ ] 40 to 50%
[ ] 50% or more

Q.5 Please indicate the number of computer training programme attended in the last two year.(Please tick the appropriate category)

[ ] 0-1 [ ] 2-3 [ ] 4-5 [ ] 5 or more

Q.6 Indicate the type of system you use

[ ] Stand alone PC
[ ] Networked PC

Q.7 In which category of end-users you would place yourself in.

[ ] Menu driven (nonskilled) end user
[ ] Command level (semiskilled) end user
[ ] Programming (skilled) end user

THANK YOU FOR YOUR PARTICIPATION

Date for interview

Time for interview

Contact address(optional)

APPENDIX C

PHASE II : QUESTIONNAIRE

1. Name: _____

(Please tick the appropriate box)

2. Age

[ ] 18-30 [ ] 30-40 [ ] 40-50 [ ] 50-60 [ ] 60-70

3. Sex

[ ] Female [ ] Male

4. How much education do you have

[ ] High School
[ ] Intermediate (10+2)
[ ] Bachelors
[ ] Masters
[ ] Ph.D

5. Your formal degree is in

[ ] Arts
[ ] Commerce
[ ] Engineering
[ ] Science
[ ] Management
[ ] Agriculture
[ ] Pharmacy
[ ] Medical
[ ] Social Science
[ ] Labour Welfare
[ ] Any other(Specify)
_____

6. Type of company or business you are employed by

[ ] Service [ ] Non - Service

7. What is your functional area

[ ] Finance
[ ] Marketing/Sales
[ ] Personnel
[ ] Production

8. How would you describe your position in the company

[ ] Manager
[ ] Executive
[ ] Professional staff
[ ] Others

9. How many years of computer experience do you have

[ ] 0-2 years
[ ] 3-4 years
[ ] 5-6 years
[ ] 6-8 years
[ ] 8 or more years

10. Estimate the number of hours per week you normally spend on computer _____(hr's)

11. Out of the total time that you spend on computers how much time do you give for improving your skills _____ (percent of the total time on computers)

12. How would you describe your position as an end user

[ ] Menu driven (nonskilled) end user
[ ] Command level (semiskilled) end user
[ ] Programming (skilled) end user

13. During the last two accounting years how many training programmes on computer usage were organised by your organisation for you

	No. of programmes	No. of hr's
Using external consultants	_____	_____
Using internal faculty	_____	_____
Involving both	_____	_____

14. Which mode of learning do you prefer most?

[ ] Formal classes
[ ] Computer tutors
[ ] Reference manuals/textbooks/workbooks
[ ] Peers
[ ] Experimentation/trial and error.

15 Which type of relationship do you prefer between trainer and learner in designing and implementing training programme.

[ ] Both trainer and learner should be equally involved in designing and implementing training programme.
[ ] Trainer or learner should dominate the design and implementation of the training programme, while other should play a minor role.

[ ] Trainer should only design and implement training programme.

[ ] Trainers and top managers should design and implement training programme.

16. Instruction The following is a list of activities related to your extent of involvement in T&D programs. Please indicate how much each phrase describes your extent of involvement in each of the activity as follows.

0 Not Applicable	1 Very Little	2 Little	3 Moderately	4 Much	5 Very Much

a)	In initiating programmes	0	1	2	3	4	5
b)	In evaluating programmes feasibility	0	1	2	3	4	5
c)	In justifying programmes expenditure	0	1	2	3	4	5
d)	In identifying training needs	0	1	2	3	4	5
e)	In setting programmes objectives	0	1	2	3	4	5
f)	In identifying potential problems	0	1	2	3	4	5
g)	In determining the content of training	0	1	2	3	4	5
h)	In scheduling the training session	0	1	2	3	4	5
i)	In training and instructing others (as trainer)	0	1	2	3	4	5
j)	In preparing reading material	0	1	2	3	4	5
k)	In working as a support person	0	1	2	3	4	5
l)	In evaluating training effectiveness	0	1	2	3	4	5

17. Instruction The purpose of the following question is to measure your satisfaction with training programmes provided by the organisation. Please mark how much you agree or disagree with each of the following statements.

1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree

Training ...

i)...was relevant to my work	1	2	3	4	5
ii)...was complete and comprehensive	1	2	3	4	5
iii)...was timely (given when I needed it)	1	2	3	4	5
iv)...was easy to understand	1	2	3	4	5
v)...was very useful	1	2	3	4	5
vi)...was very helpful	1	2	3	4	5
vii)...was presented very well	1	2	3	4	5

viii)...was handled very well 1 2 3 4 5
ix)...was too demanding 1 2 3 4 5
x)...was helpful in performing my job effectively 1 2 3 4 5
xi)...was able to deliver what was intended 1 2 3 4 5
xii)...had adequate practical sessions 1 2 3 4 5
xiii).was approved by my superiors and colleagues 1 2 3 4 5
xiv)...was up-to-date and informative 1 2 3 4 5
xv)...was imparted by skilled personnel 1 2 3 4 5
xvi)...was effective in achieving goals 1 2 3 4 5
xvii)...was provided in a congenial environment 1 2 3 4 5
xviii)...improved organising skills 1 2 3 4 5
xix)...improved communicating skills 1 2 3 4 5
xx)...improved planning capabilities 1 2 3 4 5
xxi)...improved controlling capabilities 1 2 3 4 5
xxii)...increased efficiency 1 2 3 4 5
xxiii)...improved decision making skills 1 2 3 4 5
xxiv)...increased promotional prospects 1 2 3 4 5
xxv)...infrastructure was satisfying 1 2 3 4 5
xxvi)...improved transactional skills 1 2 3 4 5
xxvii)...improved evaluation capabilities 1 2 3 4 5
xxviii)...took over certain routine tasks 1 2 3 4 5
xxix)...was enjoyable 1 2 3 4 5
xxx)...was repetitive 1 2 3 4 5
xxxi)...cultivated confidence in myself 1 2 3 4 5
xxxii)...improved my overall job performance 1 2 3 4 5
xxxiii)...duration was adequate 1 2 3 4 5

18. Introduction The purpose of the following questions is to measure how useful was your involvement in T&D activities. Please mark how much you agree or disagree with each of the following statements.

1	2	3	4	5
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

My participation in the Training and Development activities IS/WAS

a)...important 1 2 3 4 5
b)...no concerned to me 1 2 3 4 5
c)...irrelevant 1 2 3 4 5
d)...needed 1 2 3 4 5
e)...useful 1 2 3 4 5
f)...valuable 1 2 3 4 5
g)...exciting 1 2 3 4 5
h)...mundane 1 2 3 4 5

i)...significant	1	2	3	4	5
j)...superfluous	1	2	3	4	5
k)...fundamental	1	2	3	4	5
l)...beneficial	1	2	3	4	5
m)...interesting	1	2	3	4	5
n)...essential	1	2	3	4	5
o)...desirable	1	2	3	4	5
p)...unwanted	1	2	3	4	5

THANK YOU